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Taxonomic Novelties

from North America North of Mexico:

A 20-Year Vascular Plant Diversity Baseline

Ronald L. Hartman

B. E. Nelson

Missouri Botanical Garden Press

Format for entries: see page 24 for more information.

Pinus californiarum D. K. Bailey, Notes Roy. Bot. Gard. Edinburgh 44: 278, 301–308. 1987. [T] CA (MEX/SW) Calif.: Mexico; Ariz., Nev.

Category of study:
[B]=biosystematics
[S]=plants of special concern
[f or Fx]=floristics
[T]=taxonomy

Floristic region based on origin of holotype:
AK=Alaska
CA=California
CAN=Canada
GP=Great Plains
GR=Greenland
IM=Intermountain
MEX=Mexico
MO-OK=Missouri-Oklahoma
NE=Northeast
non-NA=non-North American
NW=Northwest
OR=Oregon
RM=Rocky Mountain
SE=Southeast
SW=Southwest
TX=Texas

Political units of paratypes; alphabetical by country, by province/state. See page 24 for explanation of abbreviations.

Political unit of holotype followed by a colon. See page 24 for explanation of abbreviations.

Floristic region based on origin of paratype(s), if any.

Taraxacum discretum H. Øllgaard, Nordic J. Bot. 6: 21, fig. 1986. [T] non-NA (NE) Denmark: (Conn., Maine, Vt.)

All original material from outside NA; occurrence in NA clearly stated in protologue.

Poa sierrae J. T. Howell, Wasmann J. Biol. 37: 18–19. 1980 "1979." [f] CA Calif.:

When the actual year of publication differs from the title page year, the latter date is given in quotation marks.

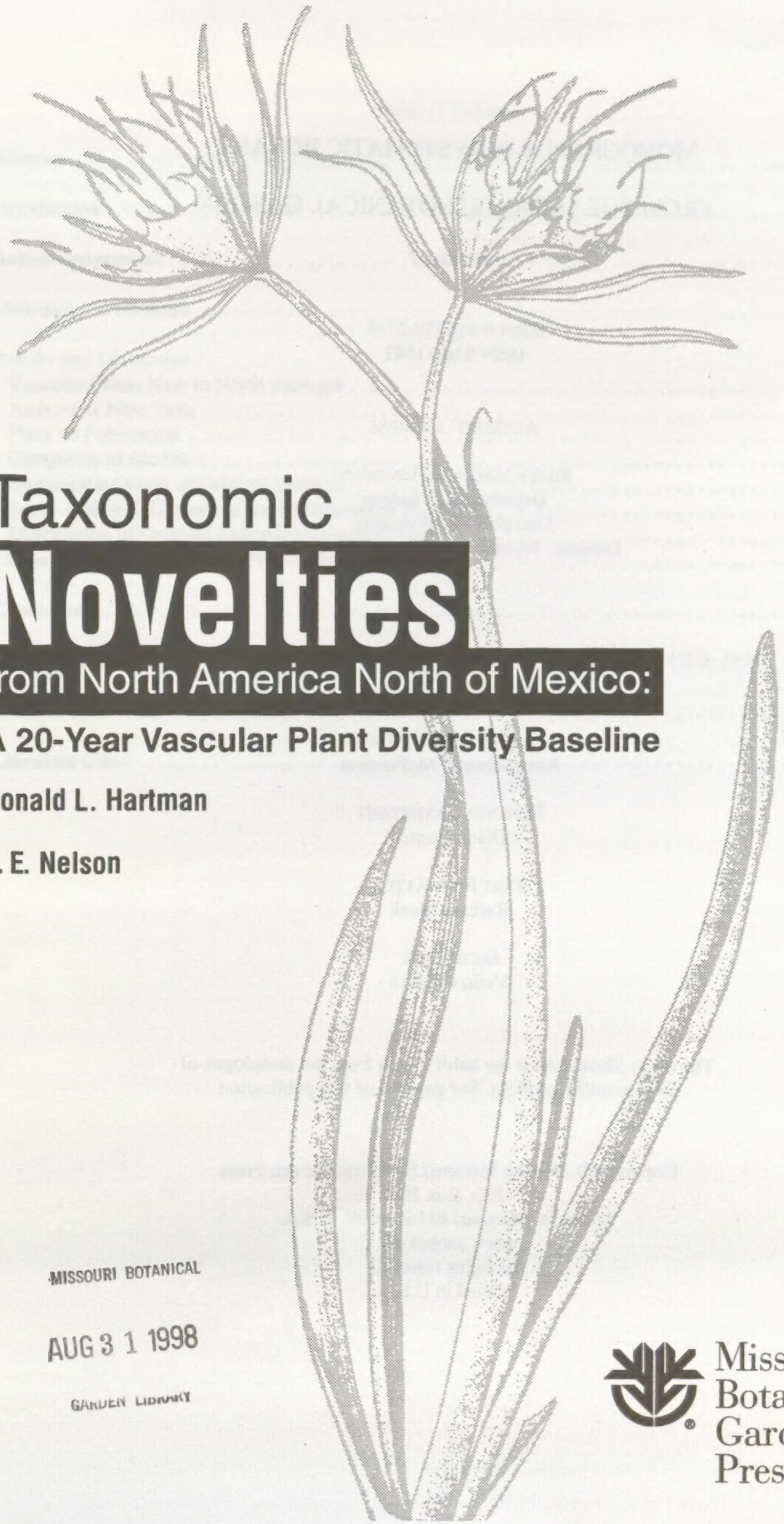
Polyctenium fremontii var. *confertum* R. C. Rollins, [Harvard Pap. Bot. 4: 47–48, 1993] Cruciferae Cont. N. Amer., p. 716. 1993. [T] CA/IM Calif.: Nev. Originally, the herbarium in which the type specimen was deposited was not stated.

Names that were invalid when originally published have the original citation in square brackets, followed by the validating citation.

**Wyethia* ×*magna* A. Nelson ex W. A. Weber, Phytologia 53: 190. 1983. [Fco] RM Colo.: No Latin.

An asterisk indicates an invalid name.

The reason for the invalidity is also given.



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AUG 3 1 1998

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Missouri Botanical Garden Press

MONOGRAPHS IN SYSTEMATIC BOTANY

FROM THE MISSOURI BOTANICAL GARDEN

Volume 67

ISBN 0-915279-57-6
ISSN 0161-1542

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The cover illustration is the habit sketch from the protologue of *Hymenocallis godfreyi*. See page 45 of this publication.

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ABSTRACT

A survey of the literature and the Gray Herbarium Card and Kew indices was performed to determine the number of taxa new to science published in North America north of Mexico from 1975 through 1994. A total of 99 families were represented, although 34 contained 1025 taxa (85.9% of the total). Five genera, *Apacheria*, *Cochiseia*, *Dedeckera*, *Shoshonea*, and *Yermo*, and one nothogenus, ×*Dryostichum*, were based solely on newly described species. New species and terminal infraspecific taxa were distributed as follows: pteridophytes with 78 (6.5%), gymnosperms with 6 (0.5%), and angiosperms with 1113 (93%) for a sum of 1197. During this 20-year period, the five-year averages for the publication of new species were 28, 35.6, 26.2, and 30.8. Comparable averages for subspecies and varieties were 7.8 and 14.8; 7 and 16; 5.8 and 17; 7.2 and 14.8, respectively. The total number of new subspecies proposed as terminal taxa was 139 (30.7%), compared to 313 (69.3%) for varieties. Data on species for the period 1955 through 1974 are also provided. With the exception of the years 1971 through 1974, when more new species were proposed, the frequency of taxonomic novelties is relatively constant over the 40-year period. A total of 505 authors participated in the publication of the 1197 new taxa, although 11.8 percent of them authored 703 taxa (59% of total). Ninety-one books and journals were involved, although 36 served as the outlet for 1093 novelties. The new taxa were divided among the following categories of study: floristics, 375 taxa; plants of conservation concern, 33; taxonomy, 703; and biosystematics, 86. The states yielding the greatest number of holotypes were: California, 217; Utah, 183; Texas, 70; Nevada, 63; Arizona, 57; Oregon, 42; New Mexico, 41; Florida, 38; Idaho, 33; and Wyoming, 32. Likewise, the leading floristic areas were: Intermountain, 596; California, 459; Rocky Mountain, 287; Southeast, 245; and Southwest, 243. It is concluded that the resurgence of biodiversity studies, as well as the efforts of monographers and contributors to regional floristic projects and to Flora of North America (FNA), will help maintain the current level of publication of novelties, but that within the next 10 to 15 years the discovery of previously unknown taxa is likely to decrease.

TAXONOMIC NOVELTIES FROM NORTH AMERICA

INTRODUCTION

Herein, the years 1975 through 1994 are covered for the entire Flora of North America (FNA) area (Canada, Greenland, St. Pierre and Miquelon, and the continental United States of America). For the sake of brevity, the name for the geographical area, as given in the title, will be shortened to North America. This study was preceded by two less inclusive compilations. The first covered a 12-year period and was restricted to the conterminous United States. It was included in a grant proposal to justify the rapid growth of the Rocky Mountain Herbarium, in part due to an active program in floristics of the region (Hartman, 1992). The second was for use in the Flora of North America North of Mexico Project (Flora of North America Committee, 1992). The time period was expanded to 17 years, although the geographic area was the same as in the first study.

The goals of the analyses are: 1) to compile a list of new taxa of vascular plants to be accounted for in FNA and possibly in other floristic projects, thus reducing inadvertent omissions; 2) to explore trends in the publication of new taxa; and 3) to serve as a baseline for studies in biodiversity. It is hoped that this account can be updated at intervals of five years. It is beyond our purview to evaluate the acceptability of each taxonomic entity proposed as new; such analyses are an ongoing process involving the community of monographers and floristicians, often over generations. Hence, the goal simply is to provide an accounting of the novelties as proposed by the authors, although a few comparisons are made on the basis of recently published floras and a checklist.

ACKNOWLEDGEMENTS

We thank Nancy Morin for requesting this update for use in the administration of the Flora of North America (FNA) Project, for encouragement and support, and access to the CD ROM of Index Kewensis (IK); David E. Boufford for providing searches of the Gray Herbarium Index database; Nancy Hastings, Donald L. Hazlett, Nancy D. Lederer, David F. Murray, Carlo A. Popolizio, Rosalie Smith, John W. Thieret, Dieter H. Wilken, and the Interlibrary Loan service, University of Wyoming Libraries, for copies of needed literature; Paula J. Wolfe for help with determining political subunits of Russia; Dean W. Taylor for educating us as to the significance of IK for North American taxa; A. Keats Smith for making the map; and colleagues Theodore M. Barkley, David Boufford, and Gregory K. Brown, reviewers Barbara Ertter and Norton G. Miller, and graduate students of our class in curatorial techniques for their thoughtful and constructive comments on the manuscript. Michael H. Grayum, editor of the Annals of the Missouri Botanical Garden, is thanked for editorial comments on the original submission.

MATERIALS AND METHODS

Included are all validly published specific and infraspecific taxa of vascular plants having original material (holotypes or paratypes) obtained from North America and proposed from 1975 through 1994. Furthermore, novelties having original material from outside North America yet clearly indicated in the protologue as occurring on this continent are included also. Listed with the validly published taxa (beginning on page 24) and included in the analyses are thirteen problematic taxa preceded by an asterisk (*). These were published as new, but do not meet all requirements for valid publication established by the *International Code of Botanical Nomenclature* (Greuter, 1994). Reasons for inadmissibility are given, based on our determination and that in Index Kewensis. It is possible that the remaining requirements for validation of some of these plants have been fulfilled subsequently as in *Dianthus armeria* forma *alba* and *Polyctenium fremontii* var. *confertum*. This paper focuses on new entities rather than nomenclatural adjustment, and so excluded from the list are: 1) new subspecific names used to group varieties; 2) new names that replace either later homonyms or epithets valid at a different rank; 3) new combinations; 4) taxa renamed (original name given) with a Latin description and a new type; 5) named artificial hybrids; and 6) cultivars. Plants clearly stated by the author as new but here considered to be in one of the above six categories are found under Omitted Names (see page 57). This is not a complete list and is restricted to groups 4, 5, and 6.

Initially, all available literature was reviewed. The *Gray Herbarium Card Index* (GHI), both cards and microfiche, was perused several times in compiling the two previous lists and this one, and queries of the GHI database were performed at Harvard for the years 1992 through 1994. Near the end of the project, supplements 16 through 19 (1971–1990) and the CD-ROM of *Index Kewensis* (IK) were searched. The latter terminated coverage October 31, 1992. Search of IK led to the discovery of 92 additional taxa, many of which were in Eurasian publications. Of the

954 novelties for seed plants, all but 16 taxa (98.3%) were found in IK (pteridophytes are not covered). These figures pertain to the years 1975 through 1991. Excluded was 1992 because IK coverage for that year was incomplete. Six of the 16 taxa of seed plants omitted by IK were published by Dorn in 1979, *Townsendia nuttallii*, and in 1988, *Artemisia biennis* var. *diffusa*, *Astragalus gilviflorus* var. *purpureus*, *Astragalus jejunus* var. *articulatus*, *Carex luzulina* var. *atropurpurea*, and *Phlox pungens*. The remaining ten, which appeared in six periodicals published in North America, are *Arctostaphylos columbiana* subsp. *nortensis*, *A. manzanita* subsp. *glaucescens*, *Artemisia tridentata* subsp. *xericensis*, *Calamagrostis canadensis* var. *dorei*, *Cypripedium montanum* forma *praetertinctum*, *Dudleya cymosa* subsp. *costafolia*, *Monardella stebbinsii*, *Pedicularis groenlandica* forma *chlorina*, *Schoenolirion wrightii*, and *Spiranthes delitescens*. A second series of searches was performed on IK-CD for the period 1955 through 1974. As this index did not begin publishing infraspecific taxa until 1971, only data on species are presented here. For this earlier 20-year period no attempt was made to obtain the original descriptions, check validity of names, etc. It is used as a rough comparator to explore trends in the publication of new species over the expanded period of 40 years (1955–1994). Based on the very high rate of inclusion by IK of novelties for the period 1975 through 1994, it is assumed that coverage for the earlier period is nearly complete. For this reason and due to time constraints, GHI was not consulted.

For the period of primary interest (1975–1994), a library of photocopies of all relevant protologues was assembled, and a database was built using Microsoft Works for Windows version 3.0. Copies of the database are available upon request.

Families of pteridophytes and gymnosperms follow the nomenclature in FNA (1993a, 1993b); those for angiosperms agree with Cronquist (1981) except for the Fabaceae, which is treated in the broad sense. For incorrect epithets, as indicated in IK and from our determinations, the accepted name appears first followed in quotation marks by the orthographic variant. An author's given name(s) was abbreviated and the surname spelled out in full. Abbreviations listed in Brummitt and Powell (1992) were not followed because over 20 percent of the authors were not found in that reference and because FNA does not abbreviate surnames, the work for which this list was compiled. Where an author's name appeared in the literature in more than one form, e.g., E. Neese and E. C. Neese, it was standardized to the more complete one. Journal citations follow *Botanico-Periodicum-Huntianum* and its Supplement (Lawrence et al., 1963; Bridson, 1991), while book abbreviations follow the recommendations in *Taxonomic Literature, 2nd ed.* (Stafleu & Cowan, 1976, 1979, 1981, 1983, 1985, 1986, 1988).

In the following sections, the term "substantive names" is used in referring to species, subspecies, and varieties. The contrasting term "minor taxa" is restricted to formae and nothotaxa. In recent years the rank of forma has been used rarely in monographs and major floras (Hamilton & Reichard, 1992; Stuessy, 1990). The taxonomic rank of nothotaxon is also placed here as its use varies greatly among taxonomic groups, and many workers prefer the less formal hybrid formula. Furthermore, hybrids generally do not breed true unless, for example, they are stabilized, apomictic, or have undergone polyploidy, processes that likely would cause them to be recognized as substantive taxa. An exception to this are hybrids that spread aggressively and extensively by vegetative means, appear to breed true, but are highly sterile.

RESULTS AND DISCUSSION

VASCULAR PLANTS NEW TO NORTH AMERICA

Although this study emphasizes species and ranks below, five genera were published during this period based solely on newly described species. They are *Apacheria* C. T. Mason (Crossosomataceae) and *Cochiseia* W. H. Earle (Cactaceae) from Arizona, *Dedeckera* J. L. Reveal & J. T. Howell (Polygonaceae) from California, and *Shoshonea* E. F. Evert & L. Constance (Apiaceae) and *Yermo* R. D. Dorn (Asteraceae) from Wyoming. Additionally, one new nothogenus appeared in the literature: ×*Dryostichum* W. H. Wagner (Dryopteridaceae) from Ontario. Genera based in part on one or more previously published species were not recorded.

A comparison of the ranks of names of vascular plants by divisions is provided in Table 1 (page 5). The subtotals representing the reference group "substantive names" are 56 (5.3%) for pteridophytes, 6 (0.5%) for gymnosperms, and 994 (94.2%) for angiosperms for a sum of 1055. The corresponding subtotals (not in Table 1) for the second reference group, "minor taxa," are 22 (15.5%) for pteridophytes, zero for gymnosperms, and 120 (84.5%) for angiosperms for a sum of 142. Formae were restricted to the angiosperms with 83, whereas the distribution of

nothotaxa was 22 (37.3%) and 37 (62.7%) for pteridophytes and angiosperms, respectively. The totals of substantive plus minor taxa for the three divisions in order are 78 (6.5%), 6 (0.5%), and 1113 (93%) members for a sum of 1197. Also given, in square brackets, is the percent for each taxonomic rank within a division.

Table 1. Summary of proposed taxa of vascular plants by division published from 1975 through 1994 for the North American flora. The numbers in parentheses are percentages within a taxonomic rank (read vertically). The numbers in square brackets are percentages of each taxonomic rank within a division (read horizontally).

	species	subsp.	var.	subtotals	formae	nothotaxa	totals
Pteridophytes	43 (7.1) [55.1]	9 (6.5) [11.6]	4 (1.3) [5.1]	56 (5.3) [71.8]		22 (37.3) [28.2]	78 (6.5) [100.0]
Gymnosperms	1 (0.2) [16.7]	3 (2.1) [50.0]	2 (0.6) [33.3]	6 (0.5) [100.0]			6 (0.5) [100.0]
Angiosperms	559 (92.7) [50.2]	127 (91.4) [11.4]	307 (98.1) [27.6]	994 (94.2) [89.2]	83 (100.0) [7.5]	37 (62.7) [3.3]	1113 (93.0) [100.0]
Totals	603 (100.0) [50.4]	139 (100.0) [11.6]	313 (100.0) [26.2]	1055 (100.0) [88.1]	83 (100.0) [6.9]	59 (100.0) [4.9]	1197 (100.0) [100.0]

A comparison of the top 34 families, those with eight or more new taxa, is found in Table 2 (page 6). Four families of the pteridophytes have 60 novelties (77% of its total) whereas 30 families of the angiosperms are represented by 965 new entities (87% of its total). For 99 families listed beginning on page 24, the distribution is 10 for pteridophytes, one for gymnosperms, and 88 for angiosperms.

The list of novelties published during a 20-year period based on original material representing North American plants, or a clear statement in the protologue of their occurrence in North America, is presented beginning on page 24, along with other relevant data (see also Materials and Methods). This list should be beneficial to various floristic projects to help prevent the omission of recently published names. No doubt there are omissions from this list. The authors would greatly appreciate being notified of oversights or errors in interpretation so that they can be incorporated, with acknowledgment, in any update.

Figure 1 presents the data from Table 3 (page 7). Peak years for the publication of new species were 1979 (38), 1981 (37), 1983 (49), 1992 (37), and 1993 (40), minimal years were 1976 (19), 1988 (12), and 1994 (21). The low number for the last year may in part be due to the unavailability of IK coverage of Eurasian literature for 1994. The five-year averages were 28, 35.6, 26.2, and 30.8 for an overall five-year average of 30.2. The number of subspecies published varied from 1 (1994) to 13 (1978). Correspondingly, varieties ranged from 8 (1990) to 32 (1993). The overall annual averages for subspecies and varieties, respectively, were 7 and 15.7, while that for all substantive names (subtotals) was 52.8. Five-year averages (not in Table 3) for the category "minor names" (formae and nothotaxa) were 4.1, 4.8, 3.3, and 2. It is surprising that despite the fluctuation in publication, the number of novelties has remained at a relatively high level each year during this recent 20-year period.

Table 2. Families with the greatest number of novelties. The 34 families having eight or more new taxa are listed. They are arranged in a descending series by the subtotals (substantive taxa). The number in parentheses after the total for each column is the percentage based on the sum for all novelties in each rank for all 99 families.

	species	subsp.	var.	subtotals	formae	nothotaxa	Totals
Asteraceae	119	15	52	186	6	2	194
Brassicaceae	58	4	29	91			91
Fabaceae	40	2	42	84	1		85
Scrophulariaceae	28	8	10	46	1		47
Polygonaceae	12	1	33	46			46
Poaceae	18	11	15	44	6	2	52
Cactaceae	19	1	16	36	2		38
Liliaceae	23	1	6	30	16		46
Apiaceae	22		5	27			27
Lamiaceae	16	1	9	26	1		27
Polemoniaceae	12	12	2	26			26
Rosaceae	16	2	7	25		6	31
Ericaceae	11	8	4	23	3		26
Cyperaceae	16	1	3	20	2	4	26
Onagraceae	12	5		17			17
Orchidaceae	13	1	2	16	7	4	27
Crassulaceae	5	10	1	16			16
Ophioglossaceae	15			15		1	16
Pteridaceae	6	6	2	14		2	16
Chenopodiaceae	7	1	6	14			14
Ranunculaceae	6	5	2	13	1	1	15
Caryophyllaceae	8	3	1	12	1		13
Portulacaceae	3	7	1	11			11
Dryopteridaceae	6	3		9	9		18
Verbenaceae	3	6		9	6	2	17
Hydrophyllaceae	3		6	9			9
Boraginaceae	6		2	8			8
Convolvulaceae		8		8			8
Loasaceae	6		2	8			8
Fagaceae	3		4	7		3	10
Primulaceae	5		2	7	1		8
Aceraceae		2	4	6	8		14
Isoëtaceae	6			6		4	10
Violaceae	4			4		4	8
Totals	527 (87)	124 (89)	268 (86)	919 (87)	62 (75)	44 (76)	1025 (86)

Table 3. Number of taxonomic novelties from North America published from 1975 through 1994. Subtotals (substantive taxa) and totals are given along with five-year averages. These numbers are reflected in Figure 1.

				subtotals			Totals
Year	species	subsp.	var.		formae	nothotaxa	
1975	29	7	13	49	15	0	64
1976	19	4	18	41	6	4	51
1977	26	6	10	42	2	4	48
1978	28	13	19	60	3	2	65
1979	38	9	14	61	3	2	66
Average	28	7.8	14.8	50.6	5.8	2.4	58.8
1980	28	12	14	54	2	1	57
1981	37	3	19	59	7	3	69
1982	31	5	13	49	9	6	64
1983	49	11	18	78	6	5	89
1984	33	4	16	53	6	3	62
Average	35.6	7	16	58.6	6	3.6	68.2
1985	29	3	11	43	5	3	51
1986	33	9	27	69	1	8	78
1987	24	5	10	39	5	3	47
1988	12	10	12	34	1	1	36
1989	33	2	25	60	4	2	66
Average	26.2	5.8	17	49	3.2	3.4	55.6
1990	29	7	8	44	2	2	48
1991	27	7	10	44	1	2	47
1992	37	11	14	62	4	4	70
1993	40	10	32	82	1	3	86
1994	21	1	10	32	0	1	33
Average	30.8	7.2	14.8	52.8	1.6	2.4	56.8
Yearly Average	30.2	7	15.7	52.8	4.2	3	59.9

The history and rationale for the use of subspecies versus variety as the primary infraspecific division has been debated for decades, most recently by Hamilton and Reichard (1992) and Holmgren (1994). The former authors indicate that in monographs published from 1987 through 1990 in 13 journals published in the U.S., varieties were employed nearly 75 percent of the time. Our results (Table 1) agree reasonably well, new subspecies were used as the terminal taxon in 139 instances (30.7%), versus 313 (69.3%) for varieties. Within the three divisions, pteridophytes were exceptional in that the rank subspecies was used more than twice as often (9 vs. 4 varieties). For states with a number of holotypes for infraspecific names, only California had a slight margin in favor of subspecies (56 vs. 55 varieties). This slight margin is surprising as California is a bastion for the application of the subspecies rank in North America due to its promotion by the early experimental taxonomist Harvey M. Hall and later Jens Clausen, David D. Keck, and William M. Hiesey (Hamilton & Reichard, 1992; Stuessy, 1990). For other states having 10 or more subspecies and varieties, only Arizona (39%) and Idaho (33%) exceeded the 30.7 percent overall average for subspecies relative to varieties (Table 8, page 19).

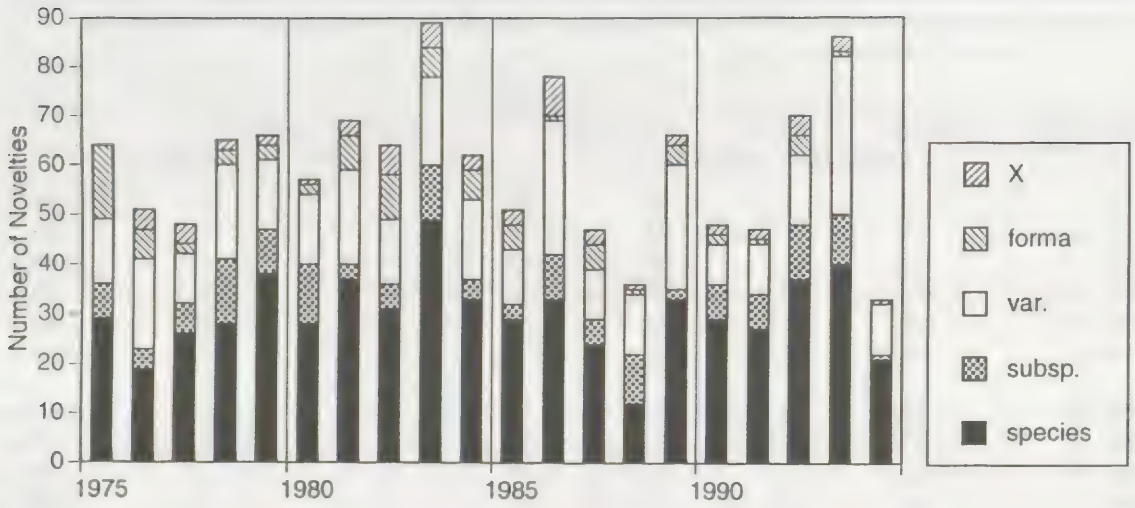

Figure 1. The number of novelties published in North America from 1975 through 1994.

For comparative purposes, the numbers of pteridophytes and gymnosperms have been plotted separately (Figure 2). Relatively few new gymnosperm taxa were published during the recent 20-year period. For pteridophytes, the most productive time was 1990 through 1993. This flurry was spurred in part by the production of *Flora of North America*, volume 2, as all taxa published between 1990 and 1994 were authored by contributors to this work. It will be interesting to see the effect of the production of future volumes of FNA on the publication of novelties.

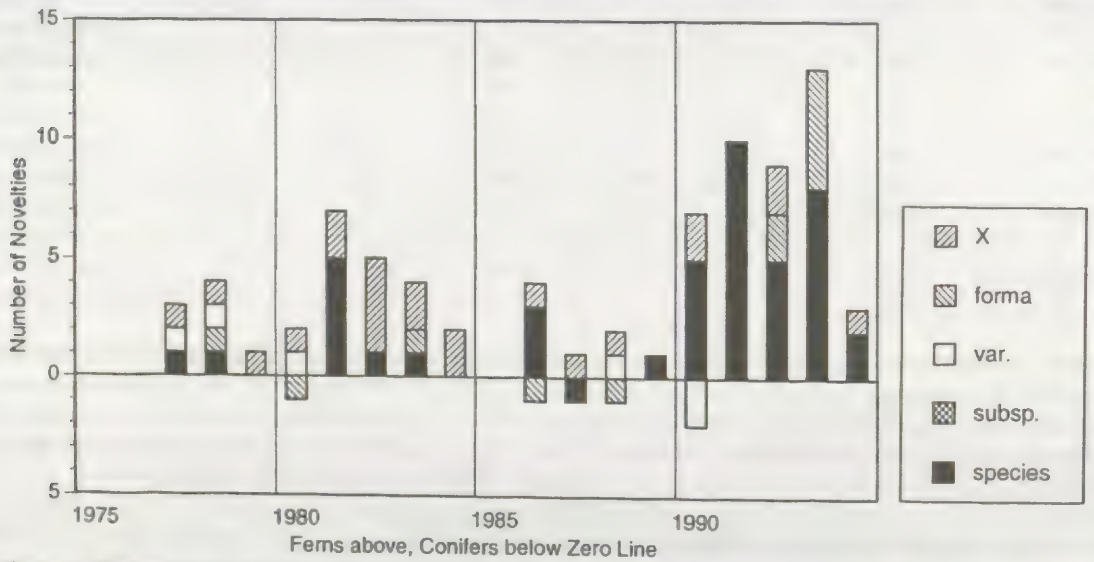

Figure 2. The number of new pteridophytes (above the zero line) and gymnosperms (below line) from North America published from 1975 through 1994.

Taxonomic Novelties from North America

As mentioned above, data were collected for species and nothospecies from IK-CD for the earlier period, 1955 through 1974. No attempt was made to compare these names with their protologues, so these data are used as a rough comparator to explore trends in the publications of new species over the expanded period of 40 years. As IK-CD contained 98.3 percent of the names found for the period 1975 through 1994, the comparison is likely to be reasonably accurate. Unfortunately, pteridophytes are not covered in IK, thus only seed plants are used in this comparison. Figure 3 (page 11) presents the results. The discussion of species will precede that for nothospecies. As is apparent, the peak years for the publication of new species were 1962 (45), 1971 (55), 1972 (74), 1973 (55), 1974 (60), and 1984 (48). The years with the fewest published were 1960 (15), 1961 (17), 1963 (13), 1988 (11), and 1991 (17). The high period of 1971 through 1974 is difficult to explain other than to note that more than the average number of workers published novelties. In reviewing these four years, the individuals (co-authors not given) who described the greatest number of species were J. L. Reveal with 18 (*Eriogonum* 12; holotypes from California, Nevada, Oregon, and Utah), N. H. Holmgren with nine (Scrophulariaceae six; Idaho, Nevada, and Utah), R. C. Rollins with six (Brassicaceae; California, New Mexico, Utah, and Wyoming), and N. D. Atwood with five (*Phacelia*, Arizona and Utah). All four were involved in revisionary work, while Reveal and Holmgren were also involved in the Intermountain Flora project. For the high periods of 1962, L. H. Shinners had eight (six families; Florida and Texas) and H. P. Traub, six (Amaryllidaceae; Florida, Georgia, North Carolina, and South Carolina); for the high period of 1988, R. C. Rollins had nine (Brassicaceae; Colorado, Idaho, Nevada, Utah, and Wyoming) and S. L. Welsh, nine (two families; Utah).

The number of nothospecies published varied considerably, with the highest years being 1955 (22), 1956 (10), 1964 (13), 1966 (19), and 1967 (14). For 27 of the years, the number varied between zero and three. The average for the period 1955 through 1974 was six; for the subsequent 20 years, three. The peak period was 1955 through 1970, with an average of 7.7. The interval 1970 through 1974 had the fewest, with an average of 1.2.

Authors of New Taxa

Five hundred and five persons were the authors of the 1197 new taxa. Those involved in the publication of six or more are listed in Table 4 (page 12). The persons listed are responsible for describing 351 (58%) species, 67 (48%) subspecies, and 218 (70%) varieties for a subtotal of 636 (60%) substantive taxa; likewise, 49 (59%) formae and 18 (31%) nothospecies. The total number of taxa described by these 56 workers (11.8% of all authors) was 703 (59% of the total).

Place of Publication

New taxa of vascular plants from the area under discussion were published in 91 periodicals or books. The 36 most frequent publications are listed in Table 5 (page 10). Not surprisingly, all but four have publication offices in North America. The number of taxa and the percent of all taxa published are: 802 (67%) for the first ten publications; 161 (13.5%) for the second ten; 90 (7.5%) for the third ten; and 40 (3.3%) for the last six. Overall, 1093 taxa (91.3% of the total) appeared in the 36 most frequently employed publications.

Categories of Studies

The type of study that led to the discovery or recognition of a novelty was determined by perusing each publication (Tables 6–7, page 14). Unfortunately, in a number of cases the author was not explicit nor was it possible to be certain of the type of study from the context. Thus the results from this section are somewhat subjective, but the general trends are likely to be accurate. The four categories of study are floristics, plants of conservation concern, taxonomy, and biosystematics. The first is divided into two parts: general floristic inventories and major flora projects (state/province, regional, or continental). Taxonomic studies include revisionary work, or a history of such work by the author on a particular group if not clearly stated. They include data on chromosome-number determinations and from morphology in the broad sense, including scanning electron microscopy. Finally, biosystematics is defined pragmatically to include artificial hybridization studies and those employing micro- or macromolecular approaches in addition to those mentioned under taxonomy.

Table 5. List of the 36 (of 91) periodicals or books where novelties were published most frequently (six or more times).

Book or Periodical	Number of taxa
Brittonia	159
Phytologia	148
Great Basin Naturalist	119
Madroño	117
Systematic Botany	61
Rhodora	58
American Fern Journal	43
Sida	42
Canadian Journal of Botany	32
Four Seasons	23
Contributions of the Gray Herbarium of Harvard University	21
Naturaliste Canadien	21
Cactus and Succulent Journal	20
Contributions from the University of Michigan Herbarium	18
Novon	16
Kalmia	15
Journal of the Arnold Arboretum	14
The Cruciferae of Continental North America (Rollins, 1993)	13
Intermountain Flora (Cronquist et al., 1977, 1984, 1989, 1994)	12
Annals of the Missouri Botanical Garden	11
Castanea	11
Bulletin of the National Museum of Canada	11
Memoirs of the New York Botanial Garden	10
Kew Bulletin	9
Michigan Botanist	9
Wrightia	9
Aliso	8
Byulleten' Moskovskogo Obshchestva Ispytatelei Prirody, Otdel Biologicheskii	8
Feddes Repertorium	8
Harvard Papers in Botany	7
Lindleyana	7
Vascular Plants of Wyoming (Dorn, 1992)	7
Southwestern Naturalist	7
Systematic Botany Monographs	7
Provancheria	6
Succulenta (Netherlands)	6
Number of new taxa appearing in the above publications (91.3% of total):	1093

The results are as follows: floristics, 375 taxa (31.3%: general, 126 taxa, 34% of this category; major projects, 249 taxa, 66%); plants of conservation concern, 33 taxa (2.8%); taxonomy, 703 taxa (58.7%); and biosystematics, 86 taxa (7.2%). The various large-scale floristic projects are listed in Table 7, with the number of names appropriately attributed.

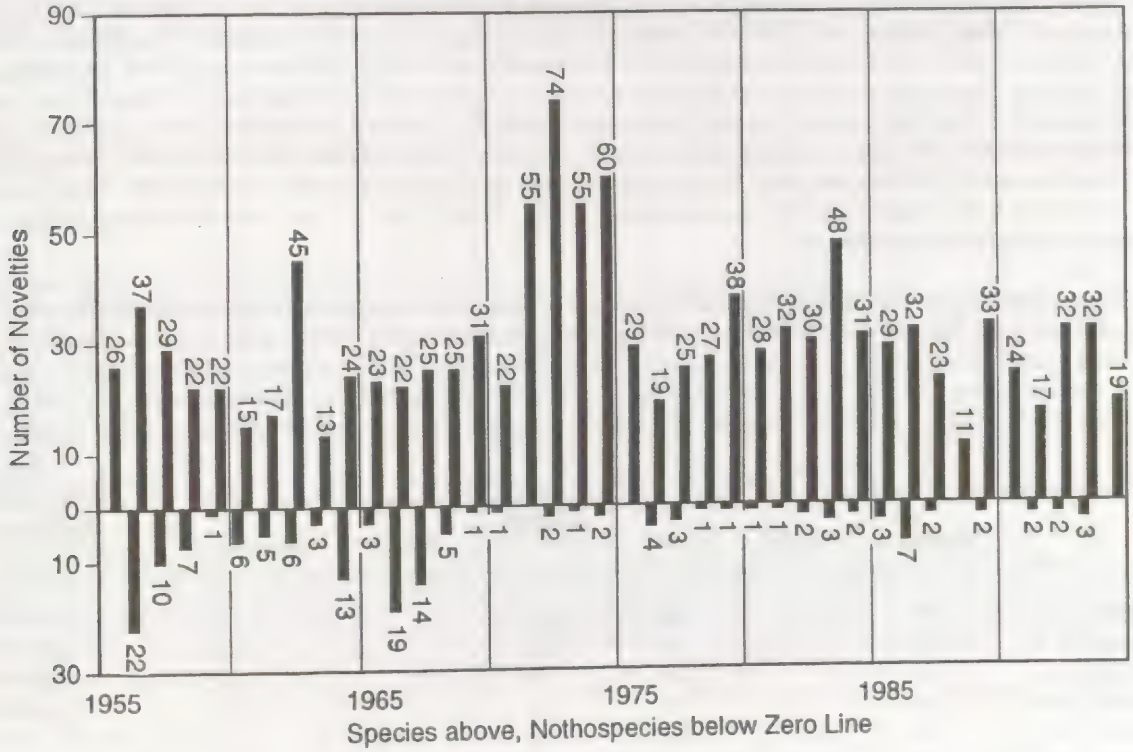

Figure 3. The number of new species (above the zero line) and nothospecies (below line) of North American plants published from 1955 through 1994.

GEOGRAPHIC ORIGIN OF ORIGINAL MATERIAL

In Table 8 (page 19), the number of holotypes for each political unit represented among the novelties is listed in descending order of frequency on the basis of the number of substantive taxa (subtotals). The number of paratypes designated from each political entity is given in parentheses. Within the study area, North America north of Mexico, there is Greenland, a self-governing province of Denmark, St. Pierre and Miquelon, a department of France, and Canada and the continental United States, both independent. Canada is subdivided into the 11 provinces and two territories and the United States into 49 states and the District of Columbia. Of these 64 political units, holotypes originated in 60 of them (exceptions being Prince Edward Island, St. Pierre and Miquelon, South Dakota, and the District of Columbia). All yielded paratypes except St. Pierre and Miquelon, the only political unit recognized in North America from which no original material was attributed. Three countries from the New World (Bahamas, Mexico, and Nicaragua) and four from the Old World (Denmark, Russia, Norway [Spitsbergen], and Sweden) were sources of one or more holotypes. Twelve countries or political units from the New World (Argentina, Bahamas, Belize, Cuba, Dominica, Guatemala, Jamaica, Mexico, Puerto Rico, Turks and Caicos Islands, Venezuela, and Virgin Islands) and 18 from the Old World (Aldabra Islands, Ascension Islands, Azores, Denmark, Egypt, Finland,

France, Great Britain, Greece, Iceland, Israel, Kazakhstan, Liberia, Marquesas Islands, Norway, Russia, Tanzania, and Turkestan) were sources of paratype material (Table 8).

Within North America, 16 political units producing the greatest numbers of holotypes (paratypes in parentheses) for substantive taxa are arranged in four groups based on major breaks in number of novelties (Table 8): group 1) California, 217 (25) and Utah, 183 (23); group 2) Texas, 70 (23), Nevada, 63 (26), and Arizona, 57 (25); group 3) Oregon, 42 (16), New Mexico, 41 (16), Florida, 38 (10), Idaho, 33 (14), Wyoming, 32 (9), and Colorado 29 (13); and group 4) Yukon Territory, 14 (8), North Carolina, 13 (16), Georgia, 13 (13), Washington, 13 (9), and Montana, 12 (10). From these political units the holotypes of 870 new species, subspecies, and varieties, (83% of the total) were obtained. The corresponding total for formae and nothotaxa is 50 (35.2%). Predictably, all 12 states from Montana south to New Mexico and Texas and westward to the Pacific Ocean are represented. For the Southeast, Florida had nearly three times the number of holotypes as Georgia or North Carolina. The only political unit outside of North America in the first twenty was Mexico with holotypes for 21 substantive taxa. All non-North American countries from which original material was obtained are listed in Table 9 (page 21) as a reminder of how widely distributed some of the novelties are.

Table 4. Individuals who authored six or more novelties of North American plants during the past two decades (56 of the 505, see Taxa of Vascular Plants, beginning on page 24). The "taxon count," at the bottom of the table, includes "duplicate authorship" (in parentheses preceded by a minus sign) as two or more workers in this list may have been coauthors. The number of "taxa described" was determined by subtracting "duplicate authorship" from "taxon count." Finally, the percent of taxa described is based on the total number of taxa published within a rank.

				subtotals			Totals
	species	subsp.	var.		formae	nothotaxa	
Welsh, S. L.	57		61	118			118
Rollins, R. C.	43	1	18	62			62
Reveal, J. L.	12		33	45			45
Barneby, R. C.	18		14	32			32
Nesom, G. L.	19		7	26			26
Holmgren, N. H.	18		7	25			25
Wagner, W. H.	16		1	17	1	6	24
Turner, B. L.	10		13	23			23
Goodrich, S.	12		7	19			19
Ertter, B.	12		6	18			18
Dorn, R. D.	12		5	17			17
Anderson, L. C.	7	9		16			16
Moldenke, H. N.			4	4	9	2	15
Murray, E.		3	4	7	8		15
Windham, M. D.	9	5		14			14
Freeman, J. D.	5			5	8		13
Kral, R.	13			13			13
Semple, J. C.	3	1	8	12	1		13
Neese, E. C.	7		5	12			12
Atwood, N. D.	8		3	11			11
Heckard, L. R.	3	8		11			11
Porsild, A. E.	4	3		7	4		11
Wells, P. V.	3	5		8	3		11

Table 4. Continued.

				subtotals			Totals
	species	subsp.	var.		formae	nothotaxa	
Boivin, B.	1		5	6	2	2	10
Constance, L.	10			10			10
Cronquist, A.	6		4	10			10
Isely, D.	2		8	10			10
Shevock, J. R.	7	1	2	10			10
Wagner, W. L.	6	4		10			10
Castetter, E. F.	4		5	9			9
Hartman, R. L.	6	1	2	9			9
Pierce, P.	4		5	9			9
Schwerin, K. H.	4		5	9			9
Brummitt, R. K.	8			8			8
Heil, K. D.	6	1	1	8			8
Nelson, T. W.	7	1		8			8
Roof, J. B.	5	1	2	8			8
Sheviak, C. J.	4			4	2	2	8
Doll, R.	7			7			7
Lepage, E.	1		1	2	1	4	7
Nelson, J. P.	7			7			7
Thorne, K. H.	4		3	7			7
Weber, W. A.	3			3	3	1	7
Alexeev, E. B.	5	1		6			6
Catling, P. M.	2		2	4	1	1	6
Cayouette, J.					5	1	6
Chuang, T. I.		6		6			6
Clausen, R. T.	2	4		6			6
Holmgren, P. K.	4		2	6			6
Morefield, J. D.	4		2	6			6
Patterson, R.	2	4		6			6
Pavlick, L. E.		1	3	4	2		6
Powell, A. M.	6			6			6
Shultz, L. M.	6			6			6
Soreng, R. J.	3	3		6			6
Wilken, D. H.	2	4		6			6
Taxon count	421	75	248	744	50	19	813
(-duplicate authorship)	(-70)	(-8)	(-30)	(-108)	(-1)	(-1)	(-110)
Taxa described	351	67	218	636	49	18	703
(of total)	58%	48%	70%	60%	59%	31%	59%

SOME ADDITIONAL TRENDS IN THE PUBLICATION OF NOVELTIES

Data were collected to explore three additional trends, following examples by D. W. Taylor (unpublished manuscript): the number of collections cited per novelty, the number of collectors involved in obtaining type material of each new taxon, and the time interval between date of publication and the oldest collection cited for each novelty. The first trend, the number of collections cited per taxon is depicted in Figure 4A. More than 80 percent of the taxa were represented by 10 or fewer collections (88% by 15 or fewer, 95% by 25 or fewer). The maximum numbers of specimens cited were 89, 100, 122, and 137. The average was 7.4 specimens cited per novelty.

Table 6. Categories of study leading to the discovery or recognition of novelties. The "Specific floristic projects" category indicates the various major flora projects listed in Table 7.

Category	Number of Taxa	Percent
General floristics	126	10.5
Specific floristic projects	249	20.8
Subtotal	375	31.3
Plants of special concern	33	2.8
Taxonomy	703	58.7
Biosystematics	86	7.2
Totals	1197	100.0

Table 7. Number of novelties attributed to state/province, regional, and continental floristic projects (in parentheses) with abbreviation for each as used in Taxa of Vascular Plants, beginning on page 24.

Fut (Utah)	109	Faz (Arizona)	3
Fim (Intermountain)	51	Ffl (Florida)	3
Fwy (Wyoming)	14	Fru (Arctic Russia)	3
Fyk (Yukon)	11	Far (Arkansas)	2
Fcd (Chihuahuan Desert)	8	Fbc (British Columbia)	2
Fse (Southeastern U.S.A.)	7	Frm (Rocky Mountains)	2
Fca (California)	6	Fbj (Baja California, Mexico)	1
Fpp (Prairie/Plains Provinces)	6	Fgp (Great Plains)	1
Fco (Colorado)	4	Fky (Kentucky)	1
Fid (Idaho)	4	Fne (Northeastern U.S.A.)	1
Fna (North America)	4	Fnj (New Jersey)	1
Fta (Tennessee/Alabama)	4	Foh (Ohio)	1
			Total 249

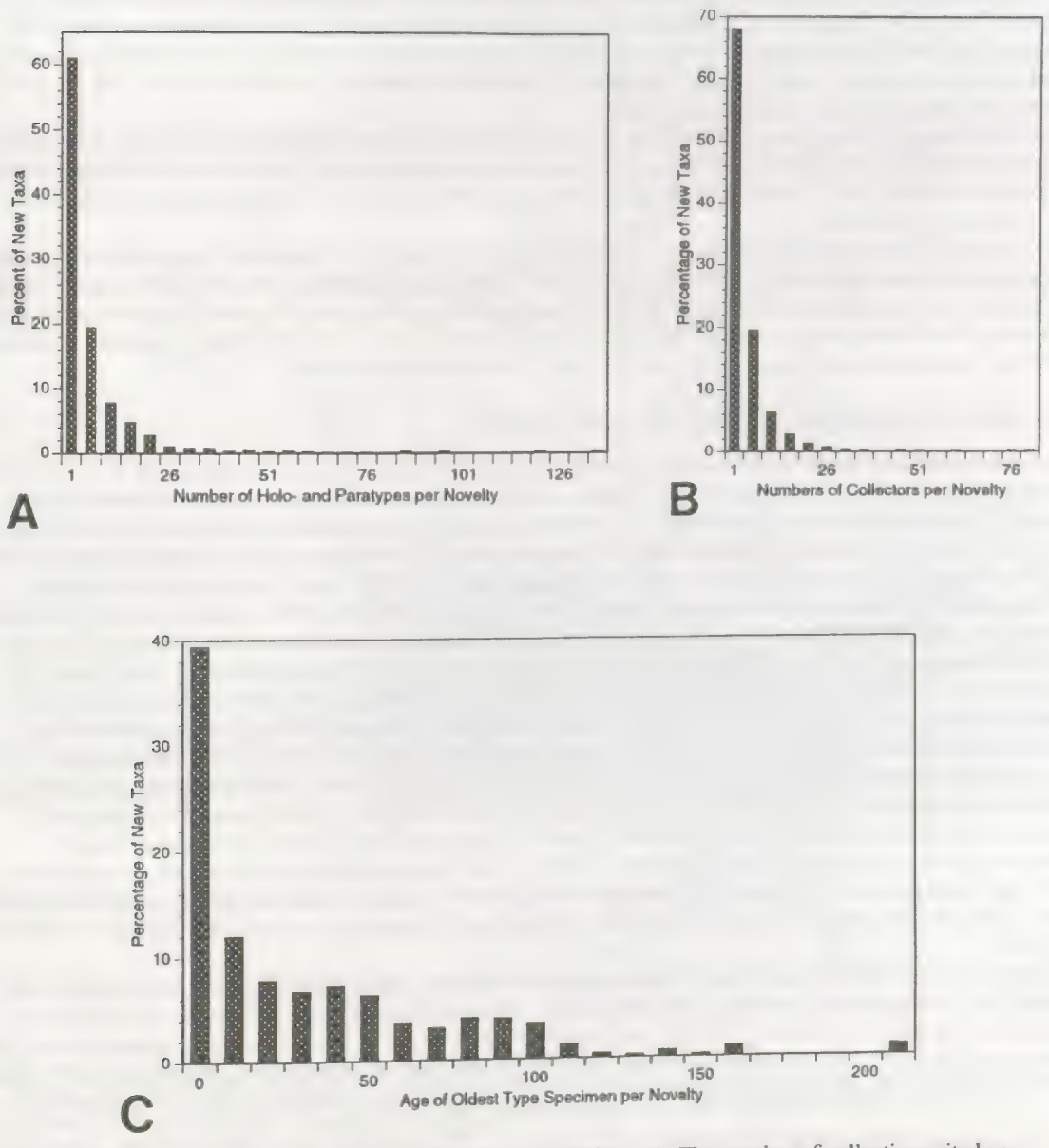

Figure 4. Three additional trends in the publication of novelties.—A. The number of collections cited per novelty (taxon count = 1197).—B. The number of collectors involved in obtaining type material of each new taxon (n = 1193).— C. The time interval between date of publication and the oldest collection cited for each novelty (n = 1017).

The second trend, the number of collectors involved in obtaining the original material of each new taxon, is shown in Figure 4B. The number of collectors includes individuals and members of collection teams. Nearly 88 percent of the novelties were based on type material obtained by ten or fewer collectors. More than 96 percent were based on material obtained by 20 or fewer individuals. The maximum number of collectors were 63, 65, 78, and 85. Overall, the average was 5.4 collectors per novelty.

The third trend, the time interval between the date of publication and the oldest collection cited for each novelty, is illustrated in Figure 4C. More than 39 percent of the novelties were based on original material less than 10 years old (59% less than 29, 73% less than 49, and nearly 92% at most 99 years old). The oldest collections cited were 151, 168, and 216 years old.

In determining the number of specimens cited per new taxon, the number of collectors responsible for obtaining type material of a new taxon, and the oldest collections per novelty, it was apparent from comments in protologues, that many authors included only a subset of specimens known to them, others only cited only their own collections even though they were aware of material obtained by other workers, while some did not check resources at relevant herbaria. Consequently, the data presented in Figures 4A–C are at best conservative.

DISTRIBUTION OF ORIGINAL MATERIAL BY FLORISTIC REGION

An attempt has been made to divide North America into regions (Figure 5) based on major floras that have been published or proposed. Some of these floristic regions are defined, in part, by the flora and physiography: Great Plains (GP), Intermountain (IM), Northeast (NE), Northwest (NW), Rocky Mountains (RM), and Southeast (SE). Others are strictly political units, generally large in area and covered by one or more state or national floras: Alaska (AK), California (CA), Canada (CAN), Greenland (GR), and Texas (TX). Arizona, New Mexico, and southern Nevada, south of the Intermountain Region (Figure 5), constitute the Southwest (SW). Finally, there are a few that are could be called "orphan areas" that have not been included in any of the above: southwest Oregon (OR) and southern Missouri and southeast Oklahoma (MO-OK). Mexico (MEX) and the remainder of the world (non-NA) are also recognized, but data from these last two areas are not used for comparative purposes. For the first group mentioned above, those defined in part by the flora and physiography, the geographic circumscriptions of the following floristic treatments were followed: GP (Great Plains Flora Association, 1986), IM (Cronquist et al., 1971 and subsequent volumes), NE (Gleason & Cronquist, 1991), NW (Hitchcock et al., 1955 and subsequent volumes), RM (proposed, Hartman, 1992), and SE (Cronquist, 1980, Argus, 1986, Isely, 1990). For this first group, as is apparent from the map, there are significant areas of overlap between adjacent floristic regions. For example, Delaware, Kentucky, Maryland, Virginia, and West Virginia share the floras of the Northeast and the Southeast. Other significant areas of overlap occur between the floras of the Northeast, Canada, and the Great Plains; the Great Plains, Texas, and the proposed flora of the Rockies; and the Rocky Mountains and that of the Northwest and also of Canada.

The two leading floristic areas (Table 9) with regards to substantive taxa (subtotals) are the Intermountain with 596 (56.5% of the total) and California, with 459 (43.5%). The next highest areas are the Rocky Mountains with 287 (27.2%), the Southeast with 245 (23.2%), and the Southwest with 243 (23%). The others with subtotals of 100 or more are Texas with 165 (15.6%), Canada with 150 (14.2%), the Northwest with 139 (13.2%), and the Northeast with 123 (11.7%). The remaining five areas in North America north of Mexico have 45 or fewer substantive taxa.

NEW TAXA ACCEPTED IN SELECTED RECENT WORKS

As stated in the introduction, it is beyond the purview of this study to evaluate the acceptability of each novelty, although a few examples have been taken from the recent literature to illustrate the degree of acceptance by various authors (Table 10, page 23). The first is Kartesz's (1994) *A Synonymized Checklist of the Vascular Flora of the United States, Canada, and Greenland.* According to the introduction, many of the families were reviewed by specialists, although the ultimate decisions on acceptability of taxa rested with the compiler of the checklist. The end of 1991 was the date for completion of the manuscript, so the 129 taxa published subsequently were not included. Additionally, eighty-four novelties, published earlier are missing from the work. Also omitted,

Figure 5. Map of North America north of Mexico showing floristic regions: AK for Alaska; CA, California; CAN, Canada; GP, Great Plains; GR, Greenland; IM, Intermountain; MO-OK, Missouri-Oklahoma (portions of each not included in NE or GP); NE, Northeast; NW, Northwest; OR, Oregon (portion not included in IM or NW); RM, Rocky Mountain; SE, Southeast; SW, Southwest (Arizona, New Mexico, and southern Nevada); and TX, Texas. Other regions mentioned in Table 10 but not used for comparative purposes are: MEX, Mexico and non-NA, non-North American.

by design, were all formae (78) except for *Eleocharis olivacea* forma *reductiseta*, which already had been elevated to varietal status by its original authors. Thus the total number of novelties included as recognized taxa or as synonyms was 906. Of these, 77 were relegated to synonymy, leaving the number of novelties accepted by Kartesz at 829 (92%).

A much smaller sample size was used for the Intermountain region and for Utah based on recently published treatments. For the former area, Cronquist (Cronquist et al., 1994) accepted 34 taxa, 65 percent of novelties published for the region for the Asteraceae; Barneby (Cronquist et al. 1989) accepted 23 (79%) for the Fabaceae. For Utah, Cronquist included 28 taxa, 65 percent of the regional novelties for the Compositae; Barneby accepted 12 (63%) of the legumes. By contrast, Welsh (1993) accepted for the respective families 41 (98%) and 20 (91%) taxa, respectively. Both Rupert Barneby and the late Arthur Cronquist differed notably from Stan Welsh in acceptance of novelties. All three of these workers are life-time students of the Intermountain flora. Many of the novelties rejected by Cronquist and Barneby were published by Welsh and associates. It remains to be seen whose taxonomic views will prevail.

The final example is from the California flora (Hickman, 1993) where 171 taxa were accepted (89% of the novelties). This last work contains treatments by nearly 200 authors, many of whom are specialists in their respective groups.

CONCLUSIONS

The significant rate of description of new taxa in North America north of Mexico over the past 20 years is due in part to intensive inventory work from the Rocky Mountain states and westward. Improved access to large expanses of the West as well as intrepid field botanists in remote, roadless areas are in part responsible. Organized programs (e.g., at the herbaria BRY, ID, RM, NY) for surveying in a systematic fashion poorly explored regions as well as seemingly well-known ones have contributed substantially. The intense interest in plants of conservation concern and funding for such surveys, often in parallel with general floristic studies, likely have had a far greater influence in the discovery of novelties than is reflected in the numbers attributed to studies of this type. The results of studies on plants of conservation concern have been reflected both in the production of revisionary studies and major floras. Over the time interval examined in this study, the floristic projects for Utah and for the Intermountain region have contributed a substantial number of novelties. During the four years prior to the publication of the Jepson Manual (Hickman, 1993), more than 48 taxa were described as new by authors who provided treatments. Thus far, the Flora of North America project has spurred the publication of a number of new pteridophytes. The rush to publish novelties for inclusion in future volumes of FNA will be interesting to watch. It is likely that the production of future volumes of FNA and of other major floristic projects as well as systematic revisions will continue to maintain the high rate of publication of novelties, although it is likely that within the next 10 to 15 years the rate will diminish substantially as work on FNA reaches completion. Further intensive inventory work in poorly known areas of the Southeast and the West, especially California, Nevada, and New Mexico, likely will be fruitful.

Table 8. Number of holotypes by political unit for the data set arranged in descending order of frequency based on subtotals (substantive taxa). Where paratypes were cited, the number, in parentheses, follows that for the holotype.

Political unit	species	subspecies	varieties	Subtotals	formae	nothotaxa	Totals
Calif.	106 (11)	56 (6)	55 (8)	217 (25)	4	2	223 (25)
Utah	88 (11)	5 (7)	90 (5)	183 (23)			183 (23)
Tex.	44 (11)	6 (4)	20 (8)	70 (23)	5		75 (23)
Nev.	43 (11)	3 (5)	17 (10)	63 (26)	1		64 (26)
Ariz.	29 (15)	11 (3)	17 (7)	57 (25)	2	1	60 (25)
Oreg.	28 (6)	2 (3)	12 (7)	42 (16)	2 (1)		44 (17)
N.Mex.	26 (7)	3 (7)	12 (2)	41 (16)			41 (16)
Fla.	25 (6)	3 (2)	10 (2)	38 (10)	13 (1)	5	56 (11)
Idaho	15 (7)	6 (2)	12 (5)	33 (14)			33 (14)
Wyo.	24 (6)	1 (1)	7 (2)	32 (9)			32 (9)
Colo.	21 (8)	4 (2)	4 (3)	29 (13)	3	1	33 (13)
Mexico	9 (23)	5 (7)	7 (4)	21 (34)	1		22 (34)
Yukon	9 (2)	3 (5)	2 (1)	14 (8)	4	1	19 (8)
N.C.	8 (12)	2 (2)	3 (2)	13 (16)	4		17 (16)
Ga.	12 (9)		1 (4)	13 (13)	2 (1)	(1)	15 (15)
Wash.	6 (2)	2 (3)	5 (4)	13 (9)			13 (9)
Mont.	9 (5)	(2)	3 (3)	12 (10)			12 (10)
Ala.	8 (6)	2 (1)	1 (3)	11 (10)		2	13 (10)
Alaska	5 (6)	4 (2)	2	11 (8)		1 (1)	12 (9)
Que.	4 (8)	4	2 (1)	10 (9)	9 (1)	7 (2)	26 (12)
B.C.	2 (6)	1 (5)	6 (3)	9 (14)	4	2 (2)	15 (16)
Ont.	5 (5)	(6)	4	9 (11)	4 (1)	3 (5)	16 (17)
Greenland	5	3 (1)	1	9 (1)		2	11 (1)
Mich.	7 (5)	(3)	1 (3)	8 (11)	1	6	15 (11)
Ark.	5 (3)	1	2 (2)	8 (5)	4	1	13 (5)
Va.	5 (7)	(4)	1 (3)	6 (14)	(1)	(1)	6 (16)
Tenn.	4 (7)	1	1 (2)	6 (9)	4	(1)	10 (10)
S.C.	4 (6)	1	(3)	5 (9)	1	(1)	6 (10)
La.	3 (1)		2 (1)	5 (2)	1	1 (1)	7 (3)
Okla.	3 (5)	(1)	1 (1)	4 (7)	1		5 (7)
Pa.	1 (3)	(3)	3	4 (6)		2 (1)	6 (7)
N.Y.	4 (3)	(3)		4 (6)	1	(2)	5 (8)
N.W.T.	2 (4)	2 (1)		4 (5)		(3)	4 (8)
Nfld.	4 (2)	(2)		4 (4)		1 (1)	5 (5)
Ill.	2 (1)	1 (1)	1 (1)	4 (3)	2	4	11 (3)
Ky.	3 (7)	(1)	(1)	3 (9)		1	4 (9)
N.S.	2 (7)	(1)	1 (1)	3 (9)		(3)	3 (12)
Alta.	1 (6)	2 (2)		3 (8)		2 (1)	5 (9)
Miss.	3 (4)	(1)	(1)	3 (6)	1		4 (6)
Mo.	1 (1)	(2)	2 (1)	3 (4)		1 (1)	4 (5)
Man.	3 (1)	(2)		3 (3)	1		4 (3)

Table 8. Continued.

Political unit	species	subspecies	varieties	Subtotals	formae	nothotaxa	Totals
Minn.	2 (6)	(3)		2 (9)	(2)	(1)	2 (12)
W.Va.	(5)	1 (1)	1 (2)	2 (8)		1 (1)	3 (9)
N.B.	2 (3)	(3)		2 (6)		(3)	2 (9)
Nebr.	(2)	(3)	2	2 (5)			2 (5)
Russia	1	1 (1)		2 (1)		(2)	2 (3)
Bahamas	1	(1)	1	2 (1)			2 (1)
Nicaragua	1	1		2			2
Vt.	1 (5)	(3)		1 (8)		1 (1)	2 (9)
Sask.	(5)	1 (3)		1 (8)			1 (8)
Ohio	1 (3)	(1)	(2)	1 (6)		4 (1)	5 (7)
N.H.	1 (4)	(2)		1 (6)	1	(1)	2 (7)
Maine	(2)	(3)	1	1 (5)			1 (5)
Wis.	1 (2)	(1)	(1)	1 (4)	(1)	1 (1)	2 (6)
N.Dak.	1 (2)	(1)		1 (3)			1 (3)
Finland		(1)	(1)	1 (2)			1 (2)
Iowa	1 (1)	(1)		1 (2)			1 (2)
Denmark	1 (1)			1 (1)			1 (1)
Spitsbergen		1		1		1	2
Sweden	1			1			1
Mass.	(5)	(3)	(1)	(9)		1	1 (9)
Ind.	(3)	(2)		(5)	1	(1)	1 (6)
N.J.	(2)	(2)	(1)	(5)	1	1 (1)	2 (6)
Kans.	(1)	(3)		(4)	2	1	3 (4)
S.Dak.	(2)	(1)	(1)	(4)			(4)
Conn.	(2)	(1)		(3)	2	(1)	2 (4)
R.I.		(2)		(2)	1		1 (2)
Argentina		(1)	(1)	(2)			(2)
Belize	(1)	(1)		(2)			(2)
Cuba	(2)			(2)			(2)
Great Britain	(1)	(1)		(2)			(2)
Guatemala		(2)		(2)			(2)
Virgin Is.	(1)	(1)		(2)			(2)
Md.	(1)			(1)		1 (1)	1 (2)
Aldabra Is.		(1)		(1)			(1)
Ascension Is.		(1)		(1)			(1)
Azores		(1)		(1)			(1)
D.C.		(1)		(1)			(1)
Dominica		(1)		(1)			(1)
Egypt		(1)		(1)			(1)
France		(1)		(1)			(1)
Greece		(1)		(1)			(1)
Iceland		(1)		(1)			(1)
Israel		(1)		(1)			(1)
Jamaica	(1)			(1)			(1)

Table 8. Continued.

Political unit	species	subspecies	varieties	Subtotals	formae	nothotaxa	Totals
Liberia		(1)		(1)			(1)
Marquesas Is.		(1)		(1)			(1)
Norway	(1)			(1)		(1)	(2)
P.E.I.		(1)		(1)			(1)
Puerto Rico		(1)		(1)			(1)
Tanzania		(1)		(1)			(1)
Turkestan		(1)		(1)			(1)
Turks & Caicos Is.			(1)	(1)			(1)
Venezuela	(1)			(1)			(1)
Kazakhstan						(1)	(1)
Totals	603	139	313	1055	83	59	1197

Table 9. Holotypes and paratypes by floristic region. The number in parentheses following that for holotype (first line under each region) represents the number of holotypes found in areas of overlap between two or more regions; the number in parentheses following that for paratypes (second line) represents the number of paratypes found in areas of overlap or in two or more separate floristic regions. The third line totals the first two. The percentages (see region IM, line three) represent the sum of holotypes and paratypes by region for that taxonomic rank relative to the total (end of column). Flora regions are arranged in descending order by subtotals (substantive taxa); all ranks are included in the total. The regions are: AK = Alaska, CA = California, CAN = Canada, GP = Great Plains, GR = Greenland, IM = Intermountain, MO-OK = Missouri-Oklahoma (portions of each not included in NE or GP), NE = Northeast, NW = Northwest, OR = Oregon (portion not included in IM or NW), RM = Rocky Mountain, SE = Southeast, SW = Southwest (Arizona, New Mexico, and southern Nevada), and TX = Texas. MEX = Mexico and non-NA = non-North American are outside the study area.

Floristic region	species		subspecies		varieties		Subtotals		formae		nothotaxa		Totals	
IM	154	(30)	13	(6)	120	(17)	287	(53)	1				288	(53)
	163	(45)	19	(15)	127	(33)	309	(93)	1				310	(93)
	317	52.6%	32	23.0%	247	78.9%	596	56.5%	2	2.4%			598	50.0%
CA	106	(8)	56	(1)	55	(1)	217	(10)	4		2		223	(10)
	117	(25)	62	(11)	63	(14)	242	(50)	5		2		249	(50)
	223	37.0	118	85.6	118	37.7	459	43.5	9	10.8	4	6.8	472	39.4
RM	85	(41)	13	(8)	33	(22)	131	(71)	4	(2)	3	(2)	138	(75)
	96	(57)	19	(15)	41	(32)	156	(104)	4	(2)	4	(3)	164	(109)
	181	30.0	26	18.7	74	23.6	287	27.2	8	9.6	7	11.9	302	25.2

Table 9. Continued

Floristic region	species		subspecies		varieties		Subtotals		formae		nothotaxa		Totals	
SE	80	(8)	11	(1)	22	(2)	113	(11)	30		11	(2)	154	(13)
	93	(24)	13	(6)	26	(8)	132	(38)	31	(1)	13	(5)	176	(44)
	173	28.7	24	17.3	48	15.3	245	23.2	61	73.5	24	40.7	330	27.6
SW	61	(15)	14	(3)	32	(6)	107	(24)	2		1		110	(24)
	74	(31)	22	(13)	40	(17)	136	(61)	2		1		139	(61)
	135	22.4	36	25.9	72	23.0	243	23.0	4	4.8	2	3.4	249	20.8
TX	44		6		20	(1)	70	(1)	5				75	(1)
	56	(16)	11	(6)	28	(6)	95	(28)	5				100	(28)
	100	16.6	17	12.2	48	15.6	165	15.6	10	12.0			175	14.6
CAN	34	(9)	13	(1)	15	(8)	62	(18)	22	(6)	16	(11)	100	(35)
	49	(31)	21	(13)	18	(13)	88	(57)	22	(7)	20	(15)	130	(79)
	83	13.8	34	24.5	33	10.5	150	14.2	44	53.0	36	61.0	230	19.2
NW	34	(22)	7	(5)	23	(13)	64	(40)	2	(1)	5	(5)	71	(46)
	36	(30)	14	(13)	25	(17)	75	(60)	2	(1)	6	(6)	83	(67)
	70	11.6	21	15.1	48	15.3	139	13.2	4	4.8	11	18.6	154	12.9
NE	36	(17)	2	(1)	13	(7)	51	(25)	14	(4)	28	(7)	93	(36)
	49	(36)	8	(8)	15	(12)	72	(56)	15	(6)	30	(13)	117	(75)
	85	14.1	10	7.2	28	8.9	123	11.7	29	34.9	58	98.3	210	17.5
MEX	9		5		7		21		1				22	
	30	(6)	12	(4)	11	(2)	53	(12)	1				54	(12)
	39	6.5	17	12.2	18	5.8	74	7.0	2	2.4			76	6.3
OR	14	(1)	2		2		18	(1)	1				19	(1)
	18	(12)	3	(2)	6	(6)	27	(20)	2	(1)			29	(21)
	32	5.3	5	3.6	8	2.6	45	4.3	3	3.6			48	4.0
AK	5		4		2		11				1		12	
	11	(6)	7	(4)	2	(1)	20	(11)			2	(1)	22	(12)
	16	2.7	11	7.9	4	1.3	31	2.9			3	5.1	34	2.8
non-NA	5		3		1		9				2		11	
	8	(1)	8	(5)	2	(1)	18	(7)			3	(1)	21	(8)
	13	2.2	11	7.9	3	1.0	27	2.6			5	8.5	32	2.7
GP	6	(4)	5	(1)	11	(5)	3	(1)	1				15	(6)
	12	(12)	3	(3)	6	(2)	21	(17)	3	(1)	2	(1)	26	(19)
	18	3.0	8	5.8	17	5.4	24	2.3	4	4.8	2	3.4	41	3.4

Table 9. Continued

Floristic region	species		subspecies		varieties		Subtotals		formae		nothotaxa		Totals	
GR	5		3		1		9				2		11	
	5		4	(1)	1		10	(1)			2		12	(1)
	10	1.7	7	5.0	2	0.6	19	1.8			4	6.8	23	1.9
MO-OK	3				1		4		1		1		6	
	7	(6)	3	(3)	2	(1)	12	(10)	1		2	(1)	15	(11)
	10	1.7	3	2.2	3	1.0	16	1.5	2	2.4	3	5.1	21	1.8
Taxa per category	603		139		313		1055		83		59		1197	

Table 10. Disposition of novelties based on origin of holotypes. The date in the first column is the estimated year when the manuscript was completed; the number that follows represents taxa published subsequently and therefore not included in that work. The term "missing" refers to names omitted for reasons not stated. "Excluded" is relevant only for Kartesz (1994) who did not include formae.

Flora Area	Ms completed: Published since	Missing	Excluded	Total Included	Placed in Synonymy	Accepted: Percent
North America						
Kartesz (1994)	1991: 129	84	78 formae	906	77	829: 92%
Intermountain						
Asteraceae						
Cronquist (1994)	1993: 1			52	18	34: 65%
Fabaceae						
Barneby (1989)	1988: 4			29	6	23: 79%
Utah						
Asteraceae						
Cronquist (1994)	1993: 1			43	15	28: 65%
Welsh et al. (1993)	1992: 2			42	1	41: 98%
Fabaceae						
Barneby (1989)	1988: 3			19	7	12: 63%
Welsh et al. (1993)	1992: 0			22	2	20: 91%
California						
Hickman (1994)	1992: 10	23		192	21	171: 89%

TAXA OF VASCULAR PLANTS NEWLY DESCRIBED FOR NORTH AMERICA NORTH OF MEXICO DURING 1975—1994.

The bi- or trinomials, including nothotaxa, are arranged alphabetically by family; families alphabetical within their appropriate divisions (pteridophytes, gymnosperms, and angiosperms). An orthographic variant, in quotation marks, follows the accepted name. The authorship is given for the terminal taxon, with literature citation and year of publication. The page number or range in numbers begins with the name of the new taxon and continues through the descriptions and listings of all type material. If these portions of the protologue are interrupted, then two page numbers, or ranges of numbers, are separated by a comma. If the actual year of publication differs from the one given, the latter follows in quotation marks.

The category of study follows: [B], biosystematics; [S], plants of special concern; [f or Fx], floristics; and [T], taxonomy (see Tables 6–7, page 14).

The two listings of floristic regions were determined by the origin of the holotype and that of the paratype, if any, in parentheses (AK = Alaska, CA = California, CAN = Canada, GP = Great Plains, GR = Greenland, IM = Intermountain, MEX = Mexico, MO-OK = Missouri-Oklahoma, NE = Northeast, non-NA = non-North American, NW = Northwest, OR = Oregon, RM = Rocky Mountain, SE = Southeast, SW = Southwest, TX = Texas; see Figure 5). The floristic region precedes the political unit for the holotype, which is set off from those for paratype(s), if any, by a colon.

The political unit of the holotype and paratype(s) are listed alphabetically by country, or for Canada and the U.S.A., then by province or territory and state (including the District of Columbia), respectively (see list of relevant abbreviations at end of legend). Due to the geographical size of Russia, the appropriate political subunit is given (Bischof & Krupp, 1993). Entries for names with no paratype(s) end in a colon. For paratype(s), semicolons separate countries, commas separate subunits where appropriate. If all original material, i.e. holotype and paratype(s), is from outside of North America and the taxon is included because its occurrence in North America is clearly stated in the protologue, then the political unit is placed in parentheses in the paratype field.

Names of taxa marked with an asterisk (*) did not meet all criteria for valid publication at the time of publication. If we are aware that the deficiencies have been corrected, the original literature citation is given in square brackets followed by the more recent one, which validates the name. Names of taxa originally indicated as new, but excluded from this list, are found at the end under Omitted Names.

Following is a key to abbreviations used for the provinces and territories of Canada:

Alta.	Alberta	Nfld.	Newfoundland	P.E.I.	Prince Edward Island
B.C.	British Columbia	N.W.T.	Northwest Territories	Que.	Quebec
Man.	Manitoba	N.S.	Nova Scotia	Sask.	Saskatchewan
N.B.	New Brunswick	Ont.	Ontario	Yukon	Yukon Territory

Following is a key to abbreviations used for states (including the District of Columbia) of the United States of America (states not listed are spelled out fully):

Ala.	Alabama	Md.	Maryland	Okla.	Oklahoma
Ariz.	Arizona	Mass.	Massacuhsetts	Oreg.	Oregon
Ark.	Arkansas	Mich.	Michigan	Pa.	Pennsylvania
Calif.	California	Minn.	Minnesota	R.I.	Rhode Island
Colo.	Colorado	Miss.	Mississippi	S.C.	South Carolina
Conn.	Connecticut	Mo.	Missouri	S.Dak.	South Dakota
Del.	Delaware	Mont.	Montana	Tenn.	Tennessee
D.C.	District of Columbia	Nebr.	Nebraska	Tex.	Texas
Fla.	Florida	Nev.	Nevada	Vt.	Vermont
Ga.	Georgia	N.H.	New Hampshire	Va.	Virginia
Ill.	Illinois	N.J.	New Jersey	Wash.	Washington
Ind.	Indiana	N.Mex.	New Mexico	W.Va.	West Virginia
Kans.	Kansas	N.Y.	New York	Wis.	Wisconsin
Ky.	Kentucky	N.C.	North Carolina	Wyo.	Wyoming
La.	Louisiana	N.Dak.	North Dakota		

PTERIDOPHYTES

ASPLENIACEAE

Asplenium ×*herb-wagneri* W. C. Taylor & R. H. Mohlenbrock, Amer. Fern J. 67: 66–67, figs. 1977. [T] NE Ill.: Ind.

Asplenium ×*morganii* W. H. Wagner, Amer. Fern J. 80: 44, figs. 1990. [T] NE Md.:

×*Asplenosorus boydstoniae* as "*boydstonae*" K. S. Walter, Amer. Fern J. 72: 62. 1982. [T] SE Ala.:

×*Asplenosorus shawneensis* R. C. Moran, Amer. Fern J. 71: 87–88, figs. 1981. [B] NE Ill.:

DRYOPTERIDACEAE

Cystopteris ×*illinoensis* R. C. Moran, Amer. Fern J. 72: 43, fig. 1982. [B] NE Ill.:

Cystopteris utahensis M. D. Windham & C. H. Haufler, Amer. Fern J. 81: 13–15, fig. 1991. [B] IM (RM/SW/TX) Utah: Ariz., Colo., Tex.

Cystopteris ×*wagneri* R. C. Moran, Castanea 48: 224–225, figs. 1983. [T] NE Ohio:

Dryopteris ×*slossoniae* E. T. Wherry ex D. B. Lellinger, Amer. Fern J. 74: 62. 1984. [T] NE Mass.:

×*Dryostichum singulare* W. H. Wagner, Canad. J. Bot. 70: 247–248, figs. 1992. [B] CAN/NE Ont.:

Gymnocarpium appalachianum K. M. Pryer & C. H. Haufler, Syst. Bot. 18: 161–163, figs. 1993. [B] NE/SE Va.: N.C., Ohio, Pa., W.Va.

Gymnocarpium dryopteris nothosubsp. *brittonianum* J. Sarvela, Ann. Bot. Fenn. 17: 292–293. 1980. [T] CAN/NE (AK/NW/RM) Ont.: Alta., B.C., N.B., N.W.T., N.S., Que.; Alaska

Gymnocarpium ×*intermedium* J. Sarvela, Ann. Bot. Fenn. 15: 105. 1978. [T] non-NA (CAN) Finland: Ont.; Russia (Tjumenskaja oblast)

Gymnocarpium jessoense subsp. *parvulum* J. Sarvela, Ann. Bot. Fenn. 15: 103–104. 1978. [T] CAN (non-NA) N.W.T.: Ont., Sask., Yukon; Finland; Kazakhstan; Russia (Krasnojarskij kraj, Sverdlovskaja oblast)

Nephrolepis ×*averyi* C. E. Nauman, Amer. Fern J. 69: 69, figs. 1979. [T] SE Fla.:

Polystichum kwakiutlii D. H. Wagner, Amer. Fern J. 80: 50–52, fig. 1990. [T] CAN B.C.:

Polystichum ×*potteri* D. S. Barrington, Rhodora 88: 298–299, 312–313, figs. 1986. [T] NE (CAN) Vt.: N.B., N.S., Que.; N.H., N.Y., Pa.

Woodsia cochisensis M. D. Windham, Contr. Univ. Michigan Herb. 19: 54–56, fig. 1993. [B] SW (MEX) Ariz.: Mexico

Woodsia ×*kansana* R. E. Brooks, Amer. Fern J. 72: 81–84, figs. 1982. [T] GP Kans.:

Woodsia neomexicana M. D. Windham, Contr. Univ. Michigan Herb. 19: 52–54, fig. 1993. [B] SW (GP/RM/TX) N.Mex.: Ariz., Colo., Okla., Tex.

Woodsia obtusa subsp. *occidentalis* M. D. Windham, Contr. Univ. Michigan Herb. 19: 56–57. 1993. [B] TX (GP/MO-OK) Tex.: Kans., Okla.

Woodsia phillipsii M. D. Windham, Contr. Univ. Michigan Herb. 19: 50, fig. 1993. [B] SW (MEX/TX) Ariz.: Mexico; N.Mex., Tex.

Woodsia scopulina subsp. *laurentiana* M. D. Windham, Contr. Univ. Michigan Herb. 19: 59–60. 1993. [B] CAN (NE) Que.: Ont.; Minn.

HYMENOPHYLLACEAE

Hymenophyllum tayloriae D. R. Farrar & C. A. Raine, Amer. Fern J. 81: 116–117, figs. 1991. [B] SE S.C.: N.C.

Trichomanes intricatum D. R. Farrar, Amer. Fern J. 82: 68–73, figs. 1992. [T] NE (SE) Ill.: Ala., Conn., Ga., Ind., Ky., Md., Mass., N.H., N.J., N.Y., N.C., Ohio, Pa., S.C., Tenn., Vt., Va., W.Va.

ISOËTACEAE

Isoëtes acadiensis L. S. Kott, Canad. J. Bot. 59: 2592–2594, fig. 1981. [T] CAN/NE N.S.: N.B.; Maine, Mass., N.H.

Isoëtes boomii N. T. Luebke, Amer. Fern J. 82: 23, figs. 1992. [B] SE Ga.:

Isoëtes ×*brittonii* D. F. Brunton & W. C. Taylor, Amer. Fern J. 80: 85–86, fig. 1990. [T] NE (SE) Pa.: Conn., N.Y., Va.

Isoëtes ×*fairbrothersii* J. D. Montgomery & W. C. Taylor, Amer. Fern J. 84: 120, figs. 1994. [Fnj] NE N.J.:

Isoëtes georgiana N. T. Luebke, Amer. Fern J. 82: 24, figs. 1992. [B] SE Ga.:

Isoëtes ×*hickeyi* W. C. Taylor & N. T. Luebke, Amer. Fern J. 78: 6, figs. 1988. [B] NE Wis.:

Isoëtes hyemalis D. F. Brunton, Castanea 59: 13–15, figs. 1994. [T] SE (NE) N.C.: S.C., Va.

Isoëtes ×*jeffreyi* D. M. Britton & D. F. Brunton, Canad. J. Bot. 70: 451, figs. 1992. [T] CAN/NE Que.:

Isoëtes prototypus D. M. Britton, Canad. J. Bot. 69: 278–281, figs. 1991. [T] CAN/NE N.B.: N.S.

Isoëtes tegetiformans P. M. Rury, Amer. Fern J. 68: 100–101, figs. 1978. [T] SE Ga.:

LYCOPODIACEAE

Huperzia appalachiana J. M. Beitel & J. T. Mickel, Amer. Fern J. 82: 45–46, fig. 1992. [T] NE (CAN/SE) N.Y.: Nfld., N.S., Ont., Que.; Ga., Maine, Mass., Mich., Minn., N.H., N.C., Tenn., Vt., Va.

Lycopodiella ×brucei R. Cranfill, Amer. Fern J. 71: 97. 1981. [Fky] NE/SE Ky.:

Lycopodiella margueritae J. G. Bruce, W. H. Wagner & J. M. Beitel, Michigan Bot. 30: 9, figs. 1991. [T] NE Mich.:

Lycopodiella subappressa J. G. Bruce, W. H. Wagner & J. M. Beitel, Michigan Bot. 30: 4–9, figs. 1991. [T] NE Mich.:

Lycopodium ×bartleyi A. W. Cusick, Amer. Fern J. 77: 100. 1987. [T] NE Ohio:

Lycopodium obscurum var. *isophyllum* R. J. Hickey, Amer. Fern J. 67: 47–48, figs. 1977. [T] NE (CAN/SE) Pa.: N.S., Que.; Mass., N.C., Ohio, Wis.

OPHIOGLOSSACEAE

Botrychium acuminatum W. H. Wagner, Contr. Univ. Michigan Herb. 17: 321–322, fig. 1990. [T] NE (CAN) Mich.: Ont.

Botrychium ascendens W. H. Wagner, Amer. Fern J. 76: 36–38, figs. 1986. [T] NW (CAN/IM/NE/RM) Oreg.: Alta., B.C., Ont., Yukon; Mont., Nev.

Botrychium campestre W. H. Wagner & D. R. Farrar, Amer. Fern J. 76: 39–42, figs. 1986. [T] GP/NE (CAN) Iowa: Alta., Sask.; Minn., Nebr., N.Dak.

Botrychium crenulatum W. H. Wagner, Amer. Fern J. 71: 21–22, figs. 1981. [T] CA Calif.:

Botrychium echo W. H. Wagner, Amer. Fern J. 73: 57–58, figs. 1983. [T] RM (IM/SW) Colo.: Ariz., Utah

Botrychium gallicomontanum D. R. Farrar & C. L. Johnson-Groh, Amer. Fern J. 81: 1–4, figs. 1991. [T] GP/NE Minn.:

Botrychium lineare W. H. Wagner, Amer. Fern J. 84: 5–8, figs. 1994. [T] NW (CA/CAN/NE/RM) Oreg.: N.B., Que.; Calif., Colo., Idaho, Mont.

Botrychium montanum W. H. Wagner, Amer. Fern J. 71: 29–30, figs. 1981. [T] NW/RM Mont.:

Botrychium mormo W. H. Wagner, Amer. Fern J. 71: 26, figs. 1981. [T] NE Minn.: Mich., Wis.

Botrychium pallidum W. H. Wagner, Amer. Fern J. 80: 74–75, fig. 1990. [T] CAN (NE/RM) Que.: Man., Ont., Sask.; Colo., Mich.

Botrychium paradoxum W. H. Wagner, Amer. Fern J. 71: 24, figs. 1981. [T] NW/RM (CAN) Mont.: Alta.

Botrychium pedunculosum W. H. Wagner, Amer. Fern J. 76: 43–45, figs. 1986. [T] NW (CAN) Oreg.: B.C., Sask.

Botrychium pseudopinnatum W. H. Wagner, Contr. Univ. Michigan Herb. 17: 322–323, figs. 1990. [T] CAN Ont.:

Botrychium rugulosum W. H. Wagner, Contr. Univ. Michigan Herb. 15: 315–319, figs. 1982. [T] NE (CAN) Mich.: Ont., Que.; Conn., Minn., N.Y., Vt., Wis.

Botrychium spathulatum W. H. Wagner, Amer. Fern J. 80: 77–81, fig. 1990. [T] CAN (AK/NE/RM) Ont.: Alta., N.W.T., Que., Yukon; Alaska, Mich., Mont.

Botrychium ×watertonense W. H. Wagner, Canad. J. Bot. 62: 630–632, figs. 1984. [B] CAN/NW/RM Alta.:

POLYPODIACEAE

Polypodium appalachianum C. H. Haufler & M. D. Windham, Amer. Fern J. 81: 18–19, fig. 1991. [B] NE (CAN/SE) N.H.: Que.; Mass., Va.

Polypodium calirhiza S. A. Whitmore & A. R. Smith, Madroño 38: 235–238, fig. 1991. [T] CA (MEX/OR) Calif.: Mexico; Oreg.

Polypodium saximontanum M. D. Windham, Contr. Univ. Michigan Herb. 19: 47–49, fig. 1993. [B] RM (SW) Colo.: N.Mex., Wyo.

Polypodium thyssanolepis var. *riograndense* T. Wendt, Amer. Fern J. 70: 6–9, fig. 1980. [Fcd] TX (MEX/SW) Tex.: Mexico; Ariz.

PTERIDACEAE

Adiantum pedatum subsp. *calderi* W. J. Cody, Rhodora 85: 93–96, fig. 1983. [f] CAN (CA/NE/NW) Que.: Nfld.; Calif., Vt., Wash.

Adiantum pedatum var. *subpumilum* W. H. Wagner, Canad. J. Bot. 56: 1727–1728, figs. 1978. [T] CAN/NW B.C.:

Adiantum viridimontanum C. A. Paris, Rhodora 93: 108–111, fig. 1991. [B] NE Vt.:

Astrolepis cochisensis subsp. *arizonica* D. M. Benham, Amer. Fern J. 82: 60. 1992. [B] SW Ariz.:

Astrolepis sinuata subsp. *mexicana* D. M. Benham, Amer. Fern J. 82: 59. 1992. [B] TX Tex.:

Astrolepis windhamii D. M. Benham, Amer. Fern J. 82: 60, fig. 1992. [B] SW (TX) Ariz.: Tex.

Cheilanthes yavapensis T. Reeves ex M. D. Windham, Contr. Univ. Michigan Herb. 19: 32–34, fig. 1993. [B] SW Ariz.: N.Mex.

Cryptogramma cascadensis E. R. Alverson, Amer. Fern J. 79: 95–97, figs. 1989. [Fna] NW (CA/CAN/OR/RM) Wash.: B.C.; Calif., Idaho, Mont., Oreg., Wash.

Notholaena grayi subsp. *sonorensis* M. D. Windham, Contr. Univ. Michigan Herb. 19: 36. 1993. [B] MEX (SW) Mexico: Ariz.

Pellaea gastonyi M. D. Windham, Contr. Univ. Michigan Herb. 19: 36–37, fig. 1993. [B] CAN/RM (GP) B.C.: Alta., Sask.; S.Dak., Wyo.

Pellaea glabella var. *missouriensis* G. J. Gastony, Amer. Fern J. 78: 64, figs. 1988. [B] MO-OK Mo.:

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Physaria integrifolia var. *monticola* R. W. Lichvar, Madroño 31: 204–205, figs. 1984. [T] RM (NW) Wyo.: Idaho
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Stroganowia tiehmii R. C. Rollins, Syst. Bot. 7: 215–217, fig. 1982. [f] IM Nev.:

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Escobaria guadalupensis S. Brack & K. D. Heil, Cact. Succ. J. (Los Angeles) 58: 165–167, figs. 1986. [T] TX Tex.:

Escobaria orcuttii var. *koenigii* E. F. Castetter, P. Pierce & K. H. Schwerin, Cact. Succ. J. (Los Angeles) 47: 68–69, figs. 1975. [T] SW N.Mex.:

Escobaria orcuttii var. *macraxina* E. F. Castetter, P. Pierce & K. H. Schwerin, Cact. Succ. J. (Los Angeles) 47: 66–68, figs. 1975. [T] SW N.Mex.:

Escobaria sandbergii E. F. Castetter, P. Pierce & K. H. Schwerin, Cact. Succ. J. (Los Angeles) 47: 62–64, figs. 1975. [T] SW N.Mex.:

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Githopsis pulchella subsp. *serpentinicola* N. Morin, Syst. Bot. 8: 456–457, fig. 1983. [B] CA Calif.:

Githopsis tenella N. Morin, Syst. Bot. 8: 465–466, fig. 1983. [B] CA Calif.:

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Minuartia decumbens T. W. Nelson & J. P. Nelson, Brittonia 33: 162, fig. 1981. [f] CA Calif.:

Minuartia stolonifera T. W. Nelson & J. P. Nelson, Brittonia 43: 17, fig. 1991. [f] CA Calif.:

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Sagina nodosa subsp. *borealis* G. E. Crow, Rhodora 80: 28–32, fig. 1978. [T] CAN (NE) Que.: Alta., Man., N.B., Nfld., N.W.T., N.S., Ont., P.E.I., Sask.; Maine, Mich., Minn., N.H.

Silene douglasii var. *rupinae* S. R. Kephart & K. B. Sturgeon, Madroño 40: 96–97, fig. 1993. [T] NW Oreg.:

Silene nachlingerae A. Tiehm, Brittonia 37: 344–346, fig. 1985. [Fim] IM Nev.:

Stellaria porsildii C. C. Chinnappa, Syst. Bot. 17: 29–30, fig. 1992. [T] SW N.Mex.: Ariz.

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Atriplex asterocarpa H. C. Stutz, G. L. Chu & S. C. Sanderson, Madroño 41: 199–201, figs. 1994. [T] IM (SW) Utah: Ariz.

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Atriplex minuticarpa H. C. Stutz & G. L. Chu, Madroño 40: 161–164, fig. 1993. [T] IM Utah:

Atriplex persistens H. C. Stutz & G. L. Chu, Madroño 40: 211–212, fig. 1993. [T] CA Calif.:

Ceratoides lanata var. *ruinina* S. L. Welsh, Great Basin Naturalist 44: 196. 1984. [Fut] IM Utah:

Chenopodium capitatum var. *parvicapitatum* S. L. Welsh, Great Basin Naturalist 44: 199. 1984. [Fut] IM Utah:

Chenopodium incanum var. *elatum* D. J. Crawford, Brittonia 29: 292. 1977. [T] TX (SW) Tex.: Ariz., N.Mex.

Chenopodium incanum var. *occidentale* D. J. Crawford, Brittonia 29: 292. 1977. [T] CA (IM/SW) Calif.: Nev.

Grayia brandegei var. *plummeri* H. C. Stutz & S. C. Sanderson, Madroño 34: 148, figs. 1987. [T] IM (RM/SW) Utah: Colo., N.Mex., Wyo.

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Salicornia maritima S. L. Wolff & R. L. Jefferies, Canad. J. Bot. 65: 1424–1425, fig. 1987. [T] CAN (NE) Que.: N.S.

Suaeda esteroa W. R. Ferren & S. A. Whitmore, Madroño 30: 182–184, fig. 1983. [f] CA (MEX) Calif.: Mexico

Suaeda rolandii I. J. Bassett & C. W. Crompton, Canad. J. Bot. 56: 588–591, figs. 1978. [T] CAN/NE N.B.: N.S., Que.; N.J.

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Calystegia sepium subsp. *appalachiana* R. K. Brummitt, Kew Bull. 35: 329–330. 1980. [T] NE/SE (CAN) W.Va.: N.B.; Conn., Ky., Maine,

Mass., Mich., Minn., N.H., N.J., N.Y., N.C., Pa., Vt., Va.

Calystegia sepium subsp. *erratica* R. K. Brummitt, Kew Bull. 35: 330–331. 1980. [T] NE (CAN/NW) Ill.: Ont.; Ind., Mich., N.J., N.Y., Oreg., Pa.

Calystegia subacaulis subsp. *episcopalis* R. K. Brummitt, Kew Bull. 35: 327. 1980. [T] CA Calif.:

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Dudleya alainiae as "*alainae*" C. Reiser, Cact. Succ. J. (Los Angeles) 56: 148, figs. 1984. [T] CA Calif.:

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Dudleya cymosa subsp. *agourensis* K. M. Nakai, Madroño 34: 339–342, fig. 1988 "1987." [T] CA Calif.:

Dudleya cymosa subsp. *costafolia* J. A. Bartel & J. R. Shevock, Aliso 12: 701–703, fig. 1990. [f] CA Calif.:

Dudleya cymosa subsp. *crebrifolia* K. M. Nakai & D. Verity, Madroño 34: 344–345, fig. 1988 "1987." [T] CA Calif.:

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Sedum integrifolium subsp. *procerum* R. T. Clausen, Sedum N. Amer., p. 506, figs. 1975. [T] RM Colo.:

Sedum laxum subsp. *flavidum* M. F. Denton, Brittonia 30: 233–235, fig. 1978. [T] CA Calif.:

Sedum oblanceolatum R. T. Clausen, Sedum N. Amer., pp. 404–405, figs. 1975. [T] OR Oreg.:

Sedum obtusatum subsp. *paradisum* M. F. Denton, Brittonia 30: 236, fig. 1978. [T] CA Calif.:

Sedum oreganum subsp. *tenue* R. T. Clausen, Sedum N. Amer., p. 355, fig. 1975. [T] NW Wash.:

Sedum radiatum subsp. *depauperatum* R. T. Clausen, Sedum N. Amer., p. 258, fig. 1975. [T] OR Oreg.:

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CROSSOSOMATACEAE

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Glossopetalon spinescens var. *microphyllum* N. H. Holmgren, Brittonia 40: 272–273, fig. 1988. [Fim] IM (SW) Utah: Nev.

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Carex appalachica J. M. Webber & P. W. Ball, Taxon 28: 614. 1979. [T] NE N.Y.:

Carex bromoides subsp. *montana* R. F. C. Naczi, Contr. Univ. Michigan Herb. 17: 220–222. 1990. [T] SE (NE) S.C.: N.C., Va.

Carex brysonii R. F. C. Naczi, Contr. Univ. Michigan Herb. 19: 195–198, figs. 1993. [T] SE Ala.:

Carex edwardsiana E. L. Bridges & S. L. Orzell, Phytologia 67: 148–152, fig. 1989. [f] TX Tex.:

Carex ×*gauthieri* E. Lepage, Naturaliste Canad. 103: 387–388, fig. 1976. [f] CAN Que.:

Carex godfreyi R. F. C. Naczi, Contr. Univ. Michigan Herb. 19: 200–203, fig. 1993. [T] SE Fla.: Ga., N.C., S.C.

Carex haysii S. L. Welsh, Mem. New York Bot. Gard. 64: 124, fig. 1990. [Fut] IM Utah:

Carex impressinervia C. T. Bryson, R. Kral & J. R. Manhart, Rhodora 89: 357–362, figs. 1987. [T] SE Ala.: Miss., N.C.

Carex juniperorum P. M. Catling, A. A. Reznicek & W. J. Crins, Syst. Bot. 18: 497–501, fig. 1993. [f] CAN/NE (SE) Ont.: Ky., Ohio

Carex lativena S. D. Jones & G. D. Jones, Sida 15: 510–512, figs. 1993. [T] TX (SW) Tex.: Ariz.

Carex leptalea var. *tayloris* B. Boivin, Phytologia 43: 67. 1979. [Fpp] CAN B.C.:

Carex lucorum var. *austrolucorum* J. H. Rettig, Sida 13: 449–450. 1989. [T] SE N.C.:

Carex lutea R. J. LeBlond, Sida 16: 155–157, fig. 1994. [f] SE N.C.:

Carex luzulina var. *atropurpurea* R. D. Dorn, Vasc. Pl. Wyoming, p. 296. 1988. [Fwy] RM Wyo.:

Carex manhartii C. T. Bryson, Castanea 50: 15–17, fig. 1985. [T] SE N.C.: Ga.

Carex ×*massonii* R. Cayouette & E. Lepage, Naturaliste Canad. 104: 567. 1977. [T] CAN/NE Que.:

Carex ouachitana R. Kral, J. R. Manhart & C. T. Bryson, Ann. Missouri Bot. Gard. 74: 440–442, fig. 1987. [f] SE (MO-OK) Ark.: Okla.

Carex perdentata S. D. Jones, Sida 16: 342–348, fig. 1994. [T] TX (GP/M0-OK) Tex.: Okla.

Carex salina forma *corylorum* B. Boivin, Provancheria 25: 183. 1992. [T] CAN Que.:

Carex saxilittoralis A. Robertson, Rhodora 82: 370–373, figs. 1980. [f] CAN Nfld.:

Carex ×*subpaleacea* J. Cayouette, Naturaliste Canad. 117: 66–68, fig. 1991 "1990." [T] CAN Que.: Nfld., Ont.

Cyperus louisianensis J. W. Thieret, Proc. Louisiana Acad. Sci. 40: 23–24, fig. 1977. [f] SE La.:

Eleocharis olivacea forma *reductiseta* A. E. Schuyler & W. R. Ferren, Bartonia 43: 46–47, figs. 1975. [T] NE (SE) N.J.: Va.

Eriophorum ×*gauthieri* B. Boivin, Provancheria 25: 43. 1992. [T] CAN Nfld.: N.W.T.

Fimbristylis brevivaginata R. Kral, Sida 15: 318–320, fig. 1992. [T] SE Ga.: Ala.

Rhynchospora thornei R. Kral, Sida 7: 42, fig. 1977. [T] SE Ga.:

ERICACEAE

Arctostaphylos bakeri subsp. *sublaevis* P. V. Wells, Four Seasons 8(2): 63–64, fig. 1988. [T] CA Calif.:

Arctostaphylos benitoensis J. B. Roof, Four Seasons 5(4): 5–6, fig. 1978. [T] CA Calif.:

Arctostaphylos bowermaniae J. B. Roof, Four Seasons 5(4): 15–16, fig. 1978. [T] CA Calif.:

Arctostaphylos canescens subsp. *malloryi* W. Knight & R. W. Gankin, Four Seasons 6(4): 23–24. 1983. [T] CA Calif.:

Arctostaphylos chaloneorum J. B. Roof, Four Seasons 5(4): 3. 1978. [T] CA Calif.:

Arctostaphylos columbiana subsp. *nortensis* P. V. Wells, Four Seasons 8(1): 50–51. 1988. [T] CA Calif.:

Arctostaphylos gabrielensis P. V. Wells, Four Seasons 9(2): 46–47. 1992. [T] CA Calif.:

Arctostaphylos glandulosa subsp. *glaucomollis* P. V. Wells, Four Seasons 7(4): 21. 1987. [T] CA Calif.:

Arctostaphylos glandulosa forma *glaucoides* P. V. Wells, Four Seasons 7(4): 17–18. 1987. [T] CA Calif.:

Arctostaphylos glandulosa forma *wieriana* P. V. Wells, Four Seasons 7(4): 19–20. 1987. [T] MEX (CA) Mexico: (Calif.)

Arctostaphylos klamathensis S. W. Edwards, T. Keeler-Wolf & W. Knight, Four Seasons 6(4): 20, figs. 1983. [T] CA Calif.:

Arctostaphylos manzanita subsp. *glaucescens* P. V. Wells, Four Seasons 8(1): 51. 1988. [T] CA Calif.:

Arctostaphylos mendocinoensis P. V. Wells, Four Seasons 8(3): 30–31, fig. 1989. [T] CA Calif.:

Arctostaphylos mewukka forma *adenopuberula* P. V. Wells, Four Seasons 9(2): 62. 1992. [T] CA Calif.:

Arctostaphylos osoensis P. V. Wells, Four Seasons 9(2): 45. 1992. [T] CA Calif.:

Arctostaphylos patula var. *coalescens* W. Knight, Four Seasons 7(1): 21. 1984. [T] CA Calif.:

Arctostaphylos pseudopungens J. B. Roof, Four Seasons 5(4): 9, fig. 1978. [T] CA Calif.:

Arctostaphylos rainbowensis J. E. Keeley & A. Massihi, Madroño 41: 2–4, fig. 1994. [T] CA Calif.:

Arctostaphylos serpentinicola J. B. Roof, Four Seasons 5(4): 12. 1978. [T] CA Calif.:

Arctostaphylos stanfordiana subsp. *raichei* W. Knight, Four Seasons 7(3): 18–20. 1985. [T] CA Calif.:

Arctostaphylos tomentosa subsp. *daciticola* P. V. Wells, Four Seasons 9(2): 60. 1992. [T] CA Calif.:

Arctostaphylos uva-ursi subsp. *monoensis* J. B. Roof, Changing Seasons 1(3): 7. 1980. [T] CA Calif.:

Arctostaphylos uva-ursi var. *leobreweri* J. B. Roof, Changing Seasons 1(2): 26. 1980. [T] CA Calif.:

Arctostaphylos uva-ursi var. *marinensis* J. B. Roof, Changing Seasons 1(2): 19–20. 1980. [T] CA Calif.:

Arctostaphylos uva-ursi var. *suborbiculata* W. Knight, Four Seasons 7(2): 32. 1984. [T] CA Calif.:

Vaccinium sempervirens D. A. Rayner & J. Henderson, Rhodora 82: 504–506, fig. 1980. [f] SE S.C.:

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Eriocaulon nigrobracteatum E. L. Bridges & S. L. Orzell, Phytologia 74: 105–107, figs. 1993. [f] SE Fla.:

Eriocaulon pellucidum forma *clausenii* H. N. Moldenke, Phytologia 54: 399. 1983. [T] NE Conn.:

Lachnocaulon engleri forma *abludens* H. N. Moldenke, Phytologia 35: 111. 1977 "1976." [T] SE Fla.:

EUPHORBIACEAE

Croton alabamensis var. *texensis* S. Ginzbarg, Sida 15: 42–45, fig. 1992. [T] TX Tex.:

Croton atwoodianus F. C. Seymour, Phytologia 43: 169. 1979. [T] non-NA (SE) Nicaragua: Fla.

Croton texensis var. *utahensis* A. Cronquist, Great Basin Naturalist 52: 76. 1992. [Fim] IM Utah:

Euphorbia aaron-rossii A. H. Holmgren & N. H. Holmgren, Brittonia 40: 357–361, figs. 1988. [Fim] IM/SW Ariz.:

Euphorbia ocellata var. *kirbyi* J. T. Howell, Mentzelia 1: 7. 1976 "1975." [f] CA Calif.:

Euphorbia theriaca var. *spurca* M. C. Johnston, Wrightia 5: 138. 1975. [Fcd] TX (MEX) Tex.: Mexico

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Amorpha ouachitensis R. L. Wilbur, Rhodora 77: 394–397. 1975. [T] MO-OK (SE) Okla.: Ark.

Astragalus ackermanii R. C. Barneby, Brittonia 32: 26–28, fig. 1980. [Fim] SW (IM) Nev.:

Astragalus anserinus N. D. Atwood, S. Goodrich & S. L. Welsh, Great Basin Naturalist 44: 263, fig. 1984. [Fut] IM Utah: Nev.

Astragalus anxius R. J. Meinke & T. N. Kaye, Madroño 39: 194, figs. 1992. [f] CA Calif.:

Astragalus atwoodii S. L. Welsh & K. H. Thorne, Great Basin Naturalist 37: 103, fig. 1977. [f] IM/SW Ariz.:

Astragalus bibullatus R. C. Barneby & E. L. Bridges, Brittonia 39: 359–360, figs. 1987. [f] SE Tenn.:

Astragalus chuskanus R. C. Barneby & R. W. Spellenberg, Brittonia 39: 188–190, fig. 1987. [T] SW N.Mex.: Ariz.

Astragalus convallarius var. *margaretae* R. C. Barneby, Brittonia 36: 167–168. 1984. [Fim] IM Nev.:

Astragalus cremnophylax var. *hevronii* R. C. Barneby, Brittonia 44: 238. 1992. [T] SW Ariz.:

Astragalus cremnophylax var. *myriorrhaphis* R. C. Barneby, Brittonia 31: 463, fig. 1979. [T] IM/SW Ariz.:

Astragalus cusickii var. *packardiae* R. C. Barneby, Intermountain Fl. 3(B): 78–80, fig. 1989. [Fim] IM Idaho:

Astragalus debequaeus S. L. Welsh, Great Basin Naturalist 45: 31–33, fig. 1985. [f] RM Colo.:

Astragalus equisolensis E. C. Neese & S. L. Welsh, Rhodora 83: 457–459, fig. 1981. [f] IM Utah:

Astragalus eremiticus var. *ampullarioides* S. L. Welsh, Great Basin Naturalist 46: 262. 1986. [Fut] IM Utah:

Astragalus ertterae R. C. Barneby & J. R. Shevock, Aliso 11: 585–587, fig. 1987. [f] CA Calif.:

Astragalus gilviflorus var. *purpureus* R. D. Dorn, Vasc. Pl. Wyoming, p. 297. 1988. [Fwy] RM Wyo.:

Astragalus holmgreniorum R. C. Barneby, Brittonia 32: 24–25, fig. 1980. [Fim] IM/SW Ariz.: Utah

Astragalus jejunus var. *articulatus* R. D. Dorn, Vasc. Pl. Wyoming, p. 297. 1988. [Fwy] RM Wyo.:

Astragalus kerrii P. J. Knight & A. C. Cully, SouthW. Naturalist 36: 198–200, fig. 1991. [f] SW N.Mex.:

Astragalus knightii R. C. Barneby, Brittonia 35: 109. fig. 1983. [T] RM/SW N.Mex.:

Astragalus lentiginosus var. *higginsii* S. L. Welsh & K. H. Thorne, Brittonia 33: 296, fig. 1981. [f] GP/TX Tex.:

Astragalus lentiginosus var. *piscinensis* R. C. Barneby, Brittonia 29: 378–380, fig. 1977. [T] CA Calif.:

Astragalus lentiginosus var. *pohlii* S. L. Welsh & R. C. Barneby, Iselya 2: 1. 1981. [T] IM Utah:

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Centaurium namophilum var. *nevadense* C. R. Broome, Great Basin Naturalist 41: 192–195, fig. 1981. [T] IM (CA) Nev.: Calif., Idaho, Oreg., Utah
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Phacelia cronquistiana S. L. Welsh, Rhodora 95: 402, fig. 1993. [Fut] IM Utah:
Phacelia demissa var. *minor* N. D. Atwood, Great Basin Naturalist 46: 256. 1986. [Fut] IM Utah:
Phacelia hastata var. *charlestonensis* A. Cronquist, Intermountain Fl. 4: 180. 1984. [Fim] SW Nev.:
Phacelia lutea var. *mackenzieorum* J. W. Grimes & P. L. Packard, Brittonia 33: 432–434, fig. 1981. [f] IM Oreg.:
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Phacelia patuliflora var. *austrotexana* J. A. Moyer, Sida 16: 250. 1994. [T] TX Tex.:

Phacelia pulchella var. *atwoodii* S. L. Welsh, Rhodora 95: 403, fig. 1993. [Fut] IM Utah:

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Juncus tiehmii B. Ertter, Mem. New York Bot. Gard. 39: 60–62, fig. 1986. [T] CA (IM/MEX/NW/RM) Calif.: Mexico; Idaho, Nev., Oreg.

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Agastache pallidiflora var. *gilensis* R. W. Sanders, Brittonia 33: 196. 1981. [T] SW N.Mex.: Ariz.

Blephilia subnuda R. W. Simmers & R. Kral, Rhodora 94: 2–4, figs. 1992. [T] SE Ala.:

Conradina etonia R. Kral & R. B. McCartney, Sida 14: 393–396, figs. 1991. [f] SE Fla.:

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Monarda punctata var. *correllii* B. L. Turner, Phytologia 77: 74. 1994. [T] TX (MEX) Tex.: Mexico

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Salvia dorrii var. *clokeyi* J. L. Strachan, Brittonia 34: 163, fig. 1982. [T] SW (IM) Nev.:

Scutellaria drummondii var. *edwardsiana* B. L. Turner, Phytologia 76: 364. 1994. [T] TX Tex.:

Scutellaria drummondii var. *runyonii* B. L. Turner, Phytologia 76: 365. 1994. [T] TX Tex.:

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Lindera subcoriacea B. E. Wofford, J. Arnold Arbor. 64: 325–327, fig. 1983. [Fse] SE Miss.: La.

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Utricularia stygia G. Thor, Nordic J. Bot. 8: 219–221, figs. 1988. [T] non-NA (AK/CAN/NE) Sweden: N.W.T., N.S.; Denmark; Finland; Germany; Great Britain; Norway; Alaska

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Allium geyeri var. *chatterleyi* S. L. Welsh, Rhodora 95: 417–418, fig. 1993. [Fut] IM Utah:

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Allium shevockii D. W. McNeal, Madroño 34: 150–152, fig. 1987. [f] CA Calif.:

Allium texanum T. M. Howard, Herbertia 46: 125, figs. 1991 "1990." [T] TX (GP) Tex.: Okla.

Calochortus coxii M. R. Godfrey & F. T. Callahan, Phytologia 65: 216, fig. 1988. [f] OR Oreg.:

Calochortus raichei S. Farwig & V. Girard, Herbertia 43: 2–4. 1987. [T] CA Calif.:

Calochortus syntrophus F. T. Callahan II, Herbertia 49: 20–21, fig. 1993. [T] CA Calif.:

Calochortus umpquaensis N. A. Fredricks, Syst. Bot. 14: 12–13, figs. 1989. [T] OR Oreg.:

Erythronium citrinum var. *roderickii* J. R. Shevock & G. A. Allen, Phytologia 71: 102. 1991. [Fca] CA Calif.:

Erythronium elegans P. C. Hammond & K. L. Chambers, Madroño 32: 49–51, fig. 1985. [S] NW Oreg.:

Erythronium pluriflorum J. R. Shevock, J. A. Bartel & G. A. Allen, Madroño 37: 268–270, fig. 1991 "1990." [T] CA Calif.:

Hastingsia atropurpurea R. W. Becking, Madroño 33: 175–177, fig. 1986. [S] OR Oreg.:

Hastingsia serpentinicola R. W. Becking, Madroño 36: 208–209, fig. 1989. [T] OR (CA) Oreg.: Calif.

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Trillium albidum J. D. Freeman, Brittonia 27: 48–51, fig. 1975. [T] OR Oreg.:

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Trillium cernuum forma *viride* R. Cayouette & J. Cayouette, Naturaliste Canad. 111: 326. 1984. [T] CAN Que.:

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Trillium decipiens J. D. Freeman, Brittonia 27: 17–18, fig. 1975. [T] SE Ga.:

Trillium foetidissimum J. D. Freeman, Brittonia 27: 31–32, fig. 1975. [T] SE Miss.:

Trillium foetidissimum forma *luteum* J. D. Freeman, Brittonia 27: 32. 1975. [T] SE La.:

Trillium kurabayashii J. D. Freeman, Brittonia 27: 56–57, fig. 1975. [T] CA Calif.:

Trillium kurabayashii forma *luteum* V. G. Soukup, Phytologia 50: 290. 1982. [T] OR Oreg.:

Trillium maculatum forma *luteum* J. D. Freeman, Brittonia 27: 29. 1975. [T] SE Fla.:

Trillium maculatum forma *simulans* J. D. Freeman, Brittonia 27: 29. 1975. [T] SE S.C.:
Trillium ovatum forma *hibbersonii* T. M. C. Taylor & A. F. Szczawinski, Syesis 7: 250, fig. 1975 "1974." [f] CAN/NW B.C.:
Trillium parviflorum V. G. Soukup, Brittonia 32: 330–331, fig. 1980. [T] NW Wash.:
Trillium petiolatum forma *luteum* V. G. Soukup, Phytologia 50: 290–291. 1982. [T] NW Oreg.:
Trillium pusillum var. *monticulum* N. L. Bodkin & J. L. Reveal, Brittonia 34: 141–142, fig. 1982. [f] NE/SE Va.:
Trillium recurvatum forma *esepalum* J. D. Freeman & T. E. Heineke, Rhodora 89: 17, fig. 1987. [T] SE Tenn.:
Trillium reliquum J. D. Freeman, Brittonia 27: 21, fig. 1975. [T] SE Ga.:
Trillium reliquum forma *luteum* J. D. Freeman, Brittonia 27: 21. 1975. [T] SE Ga.:
Trillium stramineum forma *luteum* J. D. Freeman, Brittonia 27: 26. 1975. [T] SE Tenn.:
Trillium sulcatum T. S. Patrick, Brittonia 36: 27–30, figs. 1984. [T] SE (NE) Tenn.: Ala., Ga., Ky., N.C., Va., W.Va.
Trillium sulcatum forma *albolutescens* T. S. Patrick, Brittonia 36: 30. 1984. [T] SE N.C.:
Trillium undulatum forma *enotatum* T. S. Patrick, Rhodora 87: 157–158. 1985. [T] SE N.C.: Ga.
Triteleia ixioides subsp. *unifolia* L. W. Lenz, Aliso 8: 243, figs. 1975. [T] CA (OR) Calif.: Oreg.

LINACEAE
Linum lundellii C. M. Rogers, Sida 8: 184–185. 1979. [T] TX (MEX) Tex.: Mexico
Linum rigidum var. *simulans* C. M. Rogers, N. Amer. Fl., ser. 2, 12: 38. 1984. [T] GP Nebr.:

LOASACEAE
Mentzelia candelariae H. J. Thompson & B. A. Prigge, Phytologia 55: 281–282, figs. 1984. [B] IM Nev.:
Mentzelia cronquistii H. J. Thompson & B. A. Prigge, Great Basin Naturalist 46: 550–553, figs. 1986. [B] IM Utah:
Mentzelia goodrichii K. H. Thorne & S. L. Welsh, Rhodora 95: 407, fig. 1993. [Fut] IM Utah:
Mentzelia multicaulis var. *librina* K. H. Thorne & F. J. Smith, Great Basin Naturalist 46: 556, fig. 1986. [Fut] IM Utah:
Mentzelia packardiae J. B. Glad, Madroño 23: 289, fig. 1976. [T] IM Oreg.:
Mentzelia pumila var. *lagarosa* K. H. Thorne, Great Basin Naturalist 46: 558, fig. 1986. [Fut] IM Utah: Nev.
Mentzelia shultziorum B. A. Prigge, Great Basin Naturalist 46: 361–365, figs. 1986. [T] IM Utah:
Mentzelia thompsonii J. B. Glad, Madroño 23: 289–292, fig. 1976. [T] RM Colo.:

LOGANIACEAE
Spigelia marilandica forma *eburnea* G. S. Van Horn & J. R. Freeman, Sida 11: 249. 1985. [f] SE Tenn.:

MALVACEAE
Sphaeralcea grossulariifolia var. *moorei* S. L. Welsh, Great Basin Naturalist 40: 35. 1980. [Fut] IM Utah:
Sphaeralcea leptophylla var. *janeae* S. L. Welsh, Great Basin Naturalist 40: 36. 1980. [Fut] IM Utah:
Sphaeralcea polychroma J. C. La Duke, SouthW. Naturalist 30: 433–435, fig. 1985. [T] SW (MEX/TX) N.Mex.: Mexico; Tex.
Sphaeralcea psoraloides S. L. Welsh, Great Basin Naturalist 40: 36–37. 1980. [Fut] IM Utah:

MARANTACEAE
Thalia geniculata forma *rheumoides* A. G. Shuey, Rhodora 77: 211. 1975. [f] SE Fla.:

NAJADACEAE
Najas filifolia R. R. Haynes, Brittonia 37: 392–393. 1985. [T] SE Fla.: Ga.

NYCTAGINACEAE
Abronia argillosa S. L. Welsh & S. Goodrich, Great Basin Naturalist 40: 78, fig. 1980. [Fut] IM (RM) Utah: Colo.
Abronia nana var. *harrisii* S. L. Welsh, Great Basin Naturalist 46: 258. 1986. [Fut] IM Utah:
Abronia villosa forma *rubescens* H. N. Moldenke, Phytologia 34: 18. 1976. [f] CA Calif.:
Mirabilis austrotexana B. L. Turner, Phytologia 75: 438–439. 1994 "1993." [T] TX Tex.:
Selinocarpus maloneanus B. L. Turner, Phytologia 75: 239–241. 1994 "1993." [T] TX (MEX) Tex.: Mexico

NYMPHAEACEAE
Nymphaea odorata var. *godfreyi* D. B. Ward, Phytologia 37: 444. 1977. [Ffl] SE Fla.:

Nymphaea ×*thiona* D. B. Ward, Phytologia 37: 445. 1977. [Ffl] SE Fla.: Ga.

OLEACEAE

Forestiera godfreyi L. C. Anderson, Sida 11: 1–4, fig. 1985. [f] SE Fla.: S.C.

Fraxinus americana forma *barrii* W. H. Wagner, Michigan Bot. 27: 130. 1988. [f] NE Mich.:

ONAGRACEAE

Camissonia atwoodii A. Cronquist, Great Basin Naturalist 46: 258. 1986. [Fut] IM Utah:

Camissonia bairdii S. L. Welsh, Rhodora 95: 408, fig. 1993. [Fut] IM Utah:

Clarkia calientensis F. C. Vasek, Syst. Bot. 2: 252. 1978 "1977." [T] CA Calif.:

Clarkia concinna subsp. *automixa* R. N. Bowman, Madroño 34: 41–43, figs. 1987. [T] CA Calif.:

Clarkia concinna subsp. *raichei* G. A. Allen, V. S. Ford & L. D. Gottlieb, Madroño 37: 309–310, fig. 1991 "1990." [B] CA Calif.:

Clarkia lewisii P. H. Raven & D. R. Parnell, Ann. Missouri Bot. Gard. 64: 642. 1978 "1977." [T] CA Calif.:

Epilobium howellii P. C. Hoch, Phytologia 73: 460–461. 1993 "1992." [T] CA Calif.:

Ludwigia ravenii C. I. Peng, Syst. Bot. 9: 129–131, fig. 1984. [B] SE (NE) S.C.: Fla., N.C., Va.

Oenothera acutissima W. L. Wagner, Syst. Bot. 6: 153–157, fig. 1981. [B] IM/RM Utah: Colo.

Oenothera caespitosa subsp. *navajoensis* W. L. Wagner, R. E. Stockhouse & W. M. Klein, Monogr. Syst. Bot. Missouri Bot. Gard. 12: 66–69, fig. 1985. [B] IM (RM/SW) Utah: Ariz., Colo., N.Mex.

Oenothera clelandii W. Dietrich, P. H. Raven & W. L. Wagner, Ann. Missouri Bot. Gard. 70: 196. 1983. [B] NE Mich.:

Oenothera coryi W. L. Wagner, Ann. Missouri Bot. Gard. 73: 475–476. 1986. [B] TX Tex.:

Oenothera elata subsp. *texensis* W. Dietrich & W. L. Wagner, Ann. Missouri Bot. Gard. 74: 152. 1987. [B] TX Tex.:

Oenothera falfurriae W. Dietrich & W. L. Wagner, Ann. Missouri Bot. Gard. 74: 149. 1987. [B] TX Tex.:

Oenothera harringtonii W. L. Wagner, R. E. Stockhouse & W. M. Klein, Ann. Missouri Bot. Gard. 70: 195. 1983. [B] GP/RM Colo.:

Oenothera heterophylla subsp. *orientalis* W. Dietrich, P. H. Raven & W. L. Wagner, Ann. Missouri Bot. Gard. 70: 196. 1983. [B] SE Ala.:

Oenothera kleinii W. L. Wagner & S. W. Mill, Syst. Bot. 9: 50–52, fig. 1984. [T] RM Colo.:

ORCHIDACEAE

Cypripedium ×*columbianum* C. J. Sheviak, Amer. Orchid Soc. Bull. 61: 558, figs. 1992. [T] CAN/NW B.C.:

Cypripedium kentuckiense C. F. Reed, Phytologia 48: 426–427, fig. 1981. [f] NE/SE Ky.:

Cypripedium montanum forma *praetertinctum* C. J. Sheviak, Rhodora 92: 48. 1990. [T] CAN/RM (OR) B.C.: Oreg.

Cypripedium parviflorum forma *albolabium* L. K. Magrath & J. L. Norman, Sida 13: 372. 1989. [Fgp] MO-OK Okla.:

Deiregyne confusa L. A. Garay, Bot. Mus. Leafl. 28: 283, fig. 1982 "1980." [T] MEX (TX) Mexico: (Tex.)

Epidendrum floridense E. Hágsater, Icon. Orch. 2: 133, fig. 1993. [T] SE (non-NA) Fla.: Cuba

Habenaria flava forma *lutea* Louis-Marie ex B. Boivin, Naturaliste Canad. 109: 278. 1982. [T] CAN/NE Ont.:

Habenaria zothecina L. C. Higgins & S. L. Welsh, Great Basin Naturalist 46: 259. 1986. [Fut] IM Utah:

Listera cordata forma *tetraphylla* G. Lavoie, Provancheria 17: 92. 1984. [f] CAN Que.:

Piperia candida R. Morgan & J. D. Ackerman, Lindleyana 5: 207, fig. 1990. [T] CA (AK/CAN/NW/OR) Calif.: B.C.; Alaska, Oreg., Wash.

Piperia colemanii R. Morgan & L. Glicenstein, Lindleyana 8: 89–92, fig. 1993. [T] CA Calif.:

Piperia elegans subsp. *decurtata* R. Morgan & L. Glicenstein, Lindleyana 8: 93, fig. 1993. [T] CA Calif.:

Piperia yadonii R. Morgan & J. D. Ackerman, Lindleyana 5: 209–210, fig. 1990. [T] CA Calif.:

Platanthera ×*channellii* J. P. Folsom, Orquidea (Mexico City) 9: 344–345, fig. 1984. [T] SE (NE) Ala.: La., N.J., N.C., S.C., Tenn.

Platanthera hyperborea forma *alba* M. H. S. Light, Lindleyana 4: 158, figs. 1989. [T] CAN/NE Que.:

Platanthera pallida P. M. Brown, Novon 2: 308, fig. 1992. [T] NE N.Y.:

Platanthera praeclara C. J. Sheviak & M. L. Bowles, Rhodora 88: 278, fig. 1986. [T] GP (NE) N.Dak.: Iowa, Kans., Minn., Nebr., S.Dak.

Platanthera ×vossii F. W. Case, Michigan Bot. 22: 141–144. 1983. [f] NE Mich.:

Sacoila lanceolata forma *albidaviridis* P. M. Catling & C. J. Sheviak, Lindleyana 8: 77. 1993. [T] SE Fla.:

Spiranthes casei P. M. Catling & J. E. Cruise, Rhodora 76: 527–531, figs. 1975 "1974." [T] CAN/NE Ont.: N.S., Que.; Mich., N.H., Vt.

Spiranthes casei var. *novaescotiae* P. M. Catling, Canad. J. Bot. 59: 1261–1263, fig. 1981. [T] CAN/NE N.S.:

Spiranthes delitescens C. J. Sheviak, Rhodora 92: 215–217, fig. 1990. [T] SW Ariz.:

Spiranthes diluvialis C. J. Sheviak, Brittonia 36: 11–12, figs. 1984. [T] RM (IM) Colo.: Nev., Utah

Spiranthes infernalis C. J. Sheviak, Rhodora 91: 226–228, figs. 1989. [T] SW Nev.:

Spiranthes ovalis var. *erostellata* P. M. Catling, Brittonia 35: 123–124, figs. 1983. [T] NE (MO-OK/SE) Ill.: Ala., Ark., Fla., Ga., Ky., La., Mich., Miss., Mo., N.C., Ohio, S.C., Tenn., Va., W.Va.

Spiranthes ×simpsonii P. M. Catling & C. J. Sheviak, Lindleyana 8: 78, fig. 1993. [T] CAN/NE Ont.: N.B.; Wis.

Triphora trianthophora forma *albidoflava* P. E. Keenan, Rhodora 94: 39. 1992. [T] NE N.H.:

OROBANCHACEAE

Orobanche corymbosa subsp. *mutabilis* L. R. Heckard, Canad. J. Bot. 56: 187. 1978. [Fbc] NW (CAN/RM) Wash.: B.C.

Orobanche valida subsp. *howellii* L. R. Heckard & L. T. Collins, Madroño 29: 98–99, fig. 1982. [T] CA Calif.:

OXALIDACEAE

Oxalis illinoensis J. E. Schwegman, Phytologia 50: 467. 1982. [S] NE (SE) Ill.: Ind., Ky., Tenn.

PAPAVERACEAE

Eschscholzia minutiflora subsp. *twisselmannii* C. Clark & M. Faull, Madroño 38: 78, fig. 1991. [T] CA Calif.:

Papaver alaskanum forma *stenopetalum* A. E. Porsild, Publ. Bot. (Ottawa) 4: 30. 1975 "1974." [Fyk] CAN Yukon:

**Papaver nudicaule* subsp. *americanum* U. Rändel, Feddes Repert. 88: 435–437, fig. 1977. [T] AK (CAN) Alaska: Yukon No holotype designated.

PEDALIACEAE

Proboscidea parviflora var. *hohokamiana* P. K. Bretting, Amer. J. Bot. 69: 1537. 1982. [T] SW Ariz.:

POACEAE

Achnatherum perplexum M. E. Barkworth, Phytologia 74: 11–12. 1993. [T] SW N.Mex.:

Agropyron ×bowdenii B. Boivin, Phytologia 43: 105. 1979. [Fpp] CAN/RM Alta.:

×Agrositanion pinalenoensis G. L. Pyrah, Great Basin Naturalist 43: 135–136, figs. 1983. [T] SW Ariz.:

Andropogon glomeratus var. *scabriglumus* C. S. Campbell, Syst. Bot. 11: 291. 1986. [T] SW N.Mex.:

Andropogon virginicus var. *decipiens* C. S. Campbell, Syst. Bot. 11: 290. 1986. [T] SE Fla.:

Aristida brownii B. H. Warnock, Sida 9: 358, fig. 1982. [f] TX Tex.:

Calamagrostis canadensis var. *dorei* B. Boivin, Provancheria 12: 40. 1981. [Fpp] CAN/NE Ont.:

Calamagrostis robertii A. E. Porsild, Publ. Bot. (Ottawa) 4: 5, fig. 1975 "1974." [Fyk] CAN Yukon:

Cynodon maritimus var. *vaginaeflorus* J. A. Caro, Dominguezia 6: 20. 1983. [T] NE (SE/TX/non-NA) Pa.: Argentina; Del., Fla., Ga., Mich., N.J., Tex.

Deschampsia atropurpurea var. *payettii* E. Lepage, Naturaliste Canad. 103: 389. 1976. [T] CAN Que.:

Festuca brachyphylla subsp. *breviculmis* S. Frederiksen, Nordic J. Bot. 2: 530, figs. 1983 "1982." [T] CA Calif.:

Festuca brachyphylla subsp. *coloradensis* S. Frederiksen, Nordic J. Bot. 2: 529, figs. 1983 "1982." [T] RM Colo.:

Festuca canadensis E. B. Alexeev, Byull. Moskovsk. Obshch. Isp. Prir., Otd. Biol. 88(5): 104, fig. 1983. [T] CAN/NE Ont.:

Festuca hitchcockiana E. B. Alexeev, Byull. Moskovsk. Obshch. Isp. Prir., Otd. Biol. 87(2): 111, fig. 1982. [T] CA Calif.:

Festuca hyperborea K. Holmen ex S. Frederiksen, Bot. Not. 130: 273–274, figs. 1977. [T] GR Greenland:

Festuca idahoensis var. *roemeri* L. E. Pavlick, Canad. J. Bot. 61: 350, 353, figs. 1983. [T] CAN/NW B.C.: Wash.

Festuca jensenii as "*jenseni*" O. Gjaerevoll & L. Ryvarden, Kongel. Norske Vidensk. Selsk. Skr. (Trondheim) 1977(4): 18–20, figs. 1978 "1977." [f] GR Greenland:

Festuca mariettana E. B. Alexeev, Byull. Moskovsk. Obshch. Isp. Prir., Otd. Biol. 88(5): 103, fig. 1983. [T] SE S.C.:

Festuca michiganica E. B. Alexeev, Byull. Moskovsk. Obshch. Isp. Prir., Otd. Biol. 87(2): 116–117, fig. 1982. [T] NE Mich.:

Festuca obtusa forma *pilosifolia* W. G. Dore, Naturaliste Canad. 103: 560. 1976. [T] CAN/NE Ont.:

Festuca rubra subsp. *arenicola* E. B. Alexeev, Byull. Moskovsk. Obshch. Isp. Prir., Otd. Biol. 87(2): 115, fig. 1982. [T] CA (NW) Calif.: Oreg.

Festuca rubra var. *mediana* L. E. Pavlick, Phytologia 57: 8. 1985. [T] CAN B.C.:

Festuca rubra forma *pseudovivipara* L. E. Pavlick, Phytologia 57: 5. 1985. [T] CAN B.C.:

Festuca rubra forma *psilolemma* L. E. Pavlick, Phytologia 57: 7. 1985. [T] CAN B.C.:

Festuca saximontana var. *robertsiana* L. E. Pavlick, Canad. J. Bot. 62: 2452, figs. 1984. [T] CAN (RM) B.C.:

Festuca vivipara subsp. *glabra* S. Frederiksen, Nordic J. Bot. 1: 288–289, 292, figs. 1981. [T] GR Greenland:

Festuca viviparoidea subsp. *krajinae* L. E. Pavlick, Canad. J. Bot. 62: 2457, figs. 1984. [T] CAN B.C.:

Festuca washingtonica E. B. Alexeev, Byull. Moskovsk. Obshch. Isp. Prir., Otd. Biol. 87(2): 115–116, fig. 1982. [T] NW Wash.:

Leymus salinus subsp. *mojavensis* M. E. Barkworth & R. J. Atkins, Amer. J. Bot. 71: 621, fig. 1984. [T] CA Calif.:

Melica hitchcockii B. Boivin, Phytologia 43: 105. 1979. [Fpp] CAN/NW/RM Alta.:

Panicum mohavense J. R. Reeder, Phytologia 71: 300–301, fig. 1991. [f] IM/SW Ariz.:

Phippsia neoarctica A. Löve & D. Löve, Bot. Not. 128: 499–500. 1976 "1975." [T] GR Greenland:

Phippsia vilfoidea subsp. *beringensis* A. Löve & D. Löve, Bot. Not. 128: 501. 1976 "1975." [T] AK Alaska:

Poa abbreviata subsp. *marshii* R. J. Soreng, Phytologia 71: 390–392, fig. 1992 "1991." [T] NW/RM (CA/IM) Idaho: Calif., Nev.

Poa hartzii subsp. *alaskana* R. J. Soreng, Phytologia 71: 407–409, fig. 1992 "1991." [T] AK Alaska:

Poa keckii R. J. Soreng, Syst. Bot. 16: 520–521, fig. 1991. [T] CA Calif.:

Poa laxa subsp. *banffiana* R. J. Soreng, Phytologia 71: 396–398, fig. 1992 "1991." [T] CAN/RM (NW) Alta.: B.C.; Mont.

Poa pratensis var. *macounii* B. Boivin, Provancheria 12: 62. 1981. [Fpp] CAN/RM B.C.:

Poa sierrae J. T. Howell, Wasmann J. Biol. 37: 18–19. 1980 "1979." [f] CA Calif.:

Poa stebbinsii R. J. Soreng, Syst. Bot. 16: 513–516, fig. 1991. [T] CA Calif.:

Puccinellia howellii J. I. Davis, Madroño 37: 55–57, fig. 1990. [T] CA Calif.:

Schizachne purpurascens var. *pubescens* W. G. Dore, Naturaliste Canad. 103: 563–564. 1976. [T] CAN/NE Ont.:

Schizachyrium stoloniferum var. *wolfei* H. R. DeSelm, Sida 6: 114–115. 1975. [Fse] SE Fla.:

Sorghastrum apalachicolense D. W. Hall, Sida 9: 303–304, fig. 1982. [T] SE Fla.:

**Sphenopholis intermedia* var. *macranthera* B. Boivin, Provancheria 12: 55. 1981. [Fpp] CAN/NE Ont.: Mentioned as a "variety," followed by "var. *macranthera* f. n." [forma nov.]

Sphenopholis intermedia var. *pilosa* W. G. Dore, Naturaliste Canad. 103: 564–565. 1976. [T] CAN/NE Que.: Mich.

Stipa comata var. *falcata* B. Boivin, Phytologia 43: 106. 1979. [f] IM Nev.:

Stipa nelsonii subsp. *dorei* M. E. Barkworth & J. Maze, Taxon 28: 623. 1979. [T] CAN Alta.:

Stipa nelsonii var. *longiaristata* M. E. Barkworth & J. Maze, Taxon 28: 623. 1979. [T] NW Wash.:

Tripsacum dactyloides forma *prolificum* R. S. Dayton & C. L. Dewald, Phytologia 57: 156. 1985. [T] GP Kans.:

Trisetum spicatum forma *viviparum* A. E. Porsild, Publ. Bot. (Ottawa) 4: 9. 1975 "1974." [Fyk] CAN Yukon:

Zizania palustris forma *purpurea* W. G. Dore, Naturaliste Canad. 103: 565. 1976. [T] CAN/NE Ont.:

POLEMONIACEAE

Collomia renacta E. Joyal, Brittonia 38: 243, fig. 1986. [T] IM Oreg.: Nev.

Gilia heterostyla S. A. Cochrane & A. G. Day, Madroño 41: 120–123, fig. 1994. [T] IM Nev.:
Gilia latifolia var. *imperialis* S. L. Welsh, Rhodora 95: 409–410, fig. 1993. [Fut] IM Utah:
Gilia tenuis F. J. Smith & E. C. Neese, Great Basin Naturalist 49: 461, figs. 1989. [S] IM Utah:
Ipomopsis aggregata subsp. *weberi* V. Grant & D. H. Wilken, Bot. Gaz. 147: 367, figs. 1986. [T] RM (NW) Colo.: Idaho
Ipomopsis longiflora subsp. *australis* R. A. Fletcher & W. L. Wagner, Madroño 31: 20–21, fig. 1984. [f] SW (MEX) N.Mex.: Mexico; Ariz.
Ipomopsis sancti-spiritus D. H. Wilken & R. A. Fletcher, Brittonia 40: 48–50, fig. 1988. [f] RM/SW N.Mex.:
[1]*Ipomopsis spicata* subsp. *robruthii* D. H. Wilken & R. L. Hartman, Syst. Bot. 16: 158–160, fig. 1991. [T] RM Wyo.:
Ipomopsis tenuituba subsp. *latiloba* V. Grant & D. H. Wilken, Bot. Gaz. 149: 446, figs. 1988. [T] IM/SW Ariz.: Utah
Leptodactylon californicum subsp. *brevitrichomum* P. J. Gordon-Reedy, Madroño 37: 36–37, fig. 1990. [T] CA Calif.:
Leptodactylon californicum subsp. *leptotrichomum* P. J. Gordon-Reedy, Madroño 37: 38–39, fig. 1990. [T] CA Calif.:
Leptodactylon californicum subsp. *tomentosum* P. J. Gordon-Reedy, Madroño 37: 40–41, fig. 1990. [T] CA Calif.:
Leptodactylon glabrum R. Patterson & M. Yoder-Williams, Syst. Bot. 9: 261–262. 1984. [f] IM Nev.: Idaho
Linanthus floribundus subsp. *glabrus* R. Patterson, Madroño 24: 45, fig. 1977. [T] CA (MEX) Calif.: Mexico
Linanthus latisectus E. G. Buxton, Madroño 41: 178–181, fig. 1994. [T] CA Calif.:
Linanthus nuttallii subsp. *howellii* T. W. Nelson & R. Patterson, Madroño 32: 102–104, fig. 1985. [f] CA Calif.:
Linanthus nuttallii subsp. *pubescens* R. Patterson, Madroño 24: 43, fig. 1977. [T] CA/IM (SW) Calif.: Nev.
Linanthus nuttallii subsp. *tenuilobus* R. Patterson, Madroño 24: 43, fig. 1977. [T] SW Ariz.: N.Mex.
Linanthus pachyphyllus R. Patterson, Madroño 24: 44, fig. 1977. [T] CA (IM) Calif.: Nev.
Navarretia fossalis R. Moran, Madroño 24: 155–156. 1977. [Fbj] MEX (CA) Mexico: Calif.
Navarretia hamata subsp. *parviloba* A. G. Day, Novon 3: 336, fig. 1993. [T] CA Calif.:
Navarretia myersii P. S. Allen & A. G. Day, Novon 3: 337–339, fig. 1993. [T] CA Calif.:
Phlox austromontana var. *lutescens* S. L. Welsh, Great Basin Naturalist 45: 792. 1985. [Fut] IM Utah:
Phlox azurea G. L. Smith, Wasmann J. Biol. 43: 43–44, fig. 1986 "1985." [f] CA Calif.:
Phlox opalensis R. D. Dorn, Vasc. Pl. Wyoming, ed. 2, pp. 304–306, fig. 1992. [Fwy] RM Wyo.:
Phlox pungens R. D. Dorn, Vasc. Pl. Wyoming, p. 299. 1988. [Fwy] RM Wyo.:

POLYGALACEAE

Polygala nitida var. *goliadensis* T. Wendt, J. Arnold Arbor. 60: 508–509. 1979. [T] TX Tex.:
Polygala nitida var. *tamaulipana* T. Wendt, J. Arnold Arbor. 60: 508. 1979. [T] MEX (TX) Mexico: Tex.
Polygala rimulicola var. *mescalerorum* T. Wendt & T. K. Todsen, Madroño 29: 20–21, fig. 1982. [T] SW N.Mex.:

POLYGONACEAE

Aconogonon phytolaccifolium var. *glabrum* S. P. Hong, Rhodora 93: 339–340, fig. 1991. [T] NW (CA/IM/RM) Oreg.: Calif., Idaho, Nev.
Chorizanthe biloba var. *immemora* J. L. Reveal & C. B. Hardham, Phytologia 66: 138–139. 1989. [T] CA Calif.:
Chorizanthe pungens var. *hartwegiana* J. L. Reveal & C. B. Hardham, Phytologia 66: 125. 1989. [T] CA Calif.:
Dedeckera eurekensis J. L. Reveal & J. T. Howell, Brittonia 28: 246–248, fig. 1976. [T] CA/IM Calif.:
Eriogonum aliquantum J. L. Reveal, Phytologia 34: 460–461. 1976. [T] RM/SW N.Mex.:
Eriogonum breedlovei var. *shevockii* J. T. Howell, Mentzelia 1: 21. 1976 "1975." [f] CA Calif.:

[1]The epithet "robruthii" versus "robruthiorum" was recommended by Rupert Barneby apparently, according to Richare Moe and Paul Silva, because "robruth" must be considered a fictitious name. "There are two persons but only one couple, for which the name robruth was devised."

Eriogonum brevicaule var. *promiscuum* S. L. Welsh, Great Basin Naturalist 44: 531. 1984. [Fut] IM Utah:

Eriogonum capistratum J. L. Reveal, Phytologia 66: 254–255. 1989. [T] NW/RM Idaho:

Eriogonum capistratum var. *muhlickii* J. L. Reveal, Phytologia 66: 256. 1989. [T] NW/RM Mont.:

Eriogonum capistratum var. *welshii* J. L. Reveal, Phytologia 66: 256–257. 1989. [T] NW/RM Idaho:

Eriogonum corymbosum var. *matthewsiae* as "*mathewsae*" J. L. Reveal, Phytologia 34: 441. 1976. [T] IM Utah:

Eriogonum crosbyae J. L. Reveal, Brittonia 33: 442–443, fig. 1981. [S] IM Oreg.:

Eriogonum deflexum var. *rectum* J. L. Reveal, Phytologia 66: 263–264. 1989. [T] CA Calif.:

Eriogonum ericifolium var. *thornei* J. L. Reveal & J. Henrickson, Madroño 23: 205–206, fig. 1975. [f] CA Calif.:

Eriogonum gracile var. *incultum* J. L. Reveal, Phytologia 66: 265. 1989. [T] CA Calif.:

Eriogonum grande var. *dunklei* J. L. Reveal, Brittonia 33: 445. 1981. [S] CA Calif.:

Eriogonum heermannii var. *clokeyi* J. L. Reveal, Phytologia 34: 437. 1976. [T] SW (IM) Nev.:

Eriogonum jamesii var. *higginsii* S. L. Welsh, Rhodora 95: 411, fig. 1993. [Fut] IM Utah:

Eriogonum lewisii J. L. Reveal, Great Basin Naturalist 45: 277. 1985. [T] IM Nev.: Utah

Eriogonum libertini J. L. Reveal, Madroño 28: 163–165, fig. 1981. [T] CA Calif.:

Eriogonum luteolum var. *saltuarium* J. L. Reveal, Phytologia 66: 264. 1989. [T] CA Calif.:

Eriogonum meledonum J. L. Reveal, Phytologia 66: 254. 1989. [T] NW/RM Idaho:

Eriogonum natum J. L. Reveal, Great Basin Naturalist 35: 363–364. 1975. [S] IM Utah:

Eriogonum nudum var. *paralinum* J. L. Reveal, Phytologia 66: 258. 1989. [T] OR (CA) Oreg.: Calif.

Eriogonum nudum var. *regirivum* J. L. Reveal & J. C. Stebbins, Phytologia 66: 247. 1989. [T] CA Calif.:

Eriogonum ochrocephalum var. *alexanderae* J. L. Reveal, Great Basin Naturalist 45: 276. 1985. [T] IM Nev.:

Eriogonum ochrocephalum var. *sceptrum* J. L. Reveal, Phytologia 66: 252. 1989. [T] IM (RM) Idaho:

Eriogonum ovalifolium var. *pansum* J. L. Reveal, Phytologia 66: 259. 1989. [T] NW/RM Idaho: Mont.

Eriogonum ovalifolium var. *williamsiae* J. L. Reveal, Brittonia 33: 446. 1981. [S] IM Nev.:

Eriogonum prattenianum var. *avium* J. L. Reveal & J. R. Shevock, Phytologia 66: 249–250. 1989. [T] CA Calif.:

Eriogonum racemosum var. *nobilis* S. L. Welsh, Rhodora 95: 412, fig. 1993. [Fut] IM Utah:

Eriogonum shockleyi var. *packardiae* as "*packardae*" J. L. Reveal, Phytologia 66: 257. 1989. [T] IM Idaho:

Eriogonum soredium J. L. Reveal, Great Basin Naturalist 41: 229–230, fig. 1981. [S] IM Utah:

Eriogonum tiehmii J. L. Reveal, Great Basin Naturalist 45: 277–278. 1985. [T] IM Nev.:

Eriogonum trichopes var. *hooveri* J. L. Reveal, Phytologia 66: 262–263. 1989. [T] CA Calif.:

Eriogonum umbellatum var. *argus* J. L. Reveal, Phytologia 66: 261. 1989. [T] CA (OR) Calif.: Oreg.

Eriogonum umbellatum var. *desereticum* J. L. Reveal, Great Basin Naturalist 35: 365–366. 1975. [S] IM/RM Utah:

Eriogonum umbellatum var. *furcosum* J. L. Reveal, Great Basin Naturalist 45: 278–279. 1985. [T] CA (IM) Calif.: Nev.

Eriogonum umbellatum var. *goodmanii* J. L. Reveal, Phytologia 66: 259–260. 1989. [T] OR (CA) Oreg.: Calif.

Eriogonum umbellatum var. *humistratum* J. L. Reveal, Phytologia 66: 260. 1989. [T] CA Calif.:

Eriogonum umbellatum var. *juniporinum* J. L. Reveal, Great Basin Naturalist 45: 279–280. 1985. [T] IM (CA) Nev.: Calif.

Eriogonum verrucosum J. L. Reveal, Phytologia 66: 253. 1989. [T] NW/RM Idaho:

Oxytheca parishii var. *cienegensis* B. Ertter, Brittonia 32: 89–90, fig. 1980. [T] CA Calif.:

Oxytheca parishii var. *goodmaniana* B. Ertter, Brittonia 32: 90–91, fig. 1980. [T] CA Calif.:

Polygonum caurianum subsp. *hudsonianum* S. J. Wolf & J. McNeill, Rhodora 88: 469–471, fig. 1986. [T] CAN Que.:

Polygonum franktonii S. J. Wolf & J. McNeill, Rhodora 88: 474, fig. 1986. [T] CAN/NE N.S.:

PORTULACACEAE

Claytonia caroliniana var. *lewisii* J. McNeill, Canad. J. Bot. 53: 801. 1975. [T] NE/SE W.Va.:

Claytonia palustris J. R. Swanson & W. A. Kelley, Madroño 34: 155–157, fig. 1987. [T] CA Calif.:
Claytonia parviflora subsp. *grandiflora* J. M. Miller & K. L. Chambers, Novon 3: 270. 1993. [T] CA Calif.:
Claytonia perfoliata subsp. *intermontana* J. M. Miller & K. L. Chambers, Novon 3: 269. 1993. [T] IM Nev.:
Claytonia porsildii B. A. Yurtsev, Bot. Zhurn. (Moscow & Leningrad) 66: 1043. 1981. [f] CAN Yukon:
Portulaca oleracea subsp. *impolita* A. Danin & H. G. Baker, Israel J. Bot. 27: 195–196, figs. 1979 "1978." [T] TX (CA/IM/MEX/RM/SW) Tex.: Mexico; Calif., Colo., N.Mex., Utah
Portulaca oleracea subsp. *nicaraguensis* A. Danin & H. G. Baker, Israel J. Bot. 27: 186–187, figs. 1979 "1978." [T] non-NA (SE/MEX/TX) Nicaragua: Bahamas; Belize; Dominica; Guatemala; Mexico; Puerto Rico; Fla., Tex.; Virgin Is.
Portulaca oleracea subsp. *nitida* A. Danin & H. G. Baker, Israel J. Bot. 27: 194–195, figs. 1979 "1978." [T] SE (CA/IM/NE/RM/non-NA) N.C.: Aldabra Is.; Ascension Is.; Azores; England; Egypt; Tanzania; Ala., Calif., Mass., Nev., R.I., Utah, Va.
Portulaca oleracea subsp. *papillato-stellulata* A. Danin & H. G. Baker, Israel J. Bot. 27: 200, figs. 1979 "1978." [T] CA (GP/MEX/SW/non-NA) Calif.: Guatemala; Liberia; Mexico; Kans., Nebr., N.Mex.
Portulaca oleracea subsp. *stellata* A. Danin & H. G. Baker, Israel J. Bot. 27: 198–199, figs. 1979 "1978." [T] NW/RM (CAN/IM/non-NA) Idaho: Argentina; B.C., Ont.; France; Greece; Marquesas Is.; Sinai
Talinum thompsonii N. D. Atwood & S. L. Welsh, Great Basin Naturalist 45: 485–498, fig. 1985. [Fut] IM Utah:

POTAMOGETONACEAE
Potamogeton ×haynesii C. B. Hellquist & G. E. Crow, Brittonia 38: 415–417, fig. 1986. [T] NE (CAN) Mich.: Ont.; Minn., Vt.
Potamogeton ogdenii C. B. Hellquist & R. L. Hilton, Syst. Bot. 8: 88–90, figs. 1983. [B] NE N.Y.: Mass., Vt.

PRIMULACEAE
Androsace alaskana var. *reediae* as "*reedae*" S. L. Welsh & S. Goodrich, Great Basin Naturalist 40: 80, fig. 1980. [f] AK (CAN) Alaska: Yukon
Dodecatheon dentatum var. *utahense* N. H. Holmgren, Brittonia 46: 91, fig. 1994. [Fim] IM/RM Utah:
Douglasia beringensis S. Kelso, B. A. Yurtsev & D. F. Murray, Novon 4: 381–383, fig. 1994. [T] AK Alaska:
Douglasia idahoensis D. M. Henderson, Brittonia 33: 52–55, figs. 1981. [Fid] NW/RM Idaho:
Primula alcalina A. F. Cholewa & D. M. Henderson, Brittonia 36: 59–60, fig. 1984. [Fid] NW/RM Idaho:
Primula anvilensis S. Kelso, Syst. Bot. 12: 10, fig. 1987. [T] AK Alaska:
Primula domensis R. J. Kass & S. L. Welsh, Great Basin Naturalist 45: 548–550, fig. 1985. [Fut] IM Utah:
Primula mistassinica forma *plena* J. Cayouette, Naturaliste Canad. 111: 444. 1984. [T] CAN Que.:

RANUNCULACEAE
Anemone drummondii subsp. *heimburgeri* A. Löve & D. Löve, Bot. Not. 128: 511. 1976 "1975." [T] AK Alaska:
Anemone okennonii C. S. Keener & B. E. Dutton, Sida 16: 198–201, figs. 1994. [T] TX Tex.:
Aquilegia formosa var. *fosteri* S. L. Welsh, Great Basin Naturalist 46: 259–260. 1986. [Fut] IM Utah:
Aquilegia grahamii S. L. Welsh & S. Goodrich, Rhodora 95: 412, fig. 1993. [Fut] IM/RM Utah:
Clematis morefieldii R. Kral, Ann. Missouri Bot. Gard. 74: 665–668, figs. 1987. [Fta] SE Ala.:
Clematis socialis R. Kral, Rhodora 84: 287–289, figs. 1982. [f] SE Ala.:
Delphinium alabamicum R. Kral, Sida 6: 250–252, fig. 1976. [Fta] SE Ala.:
Delphinium carolinianum subsp. *calciphilum* M. J. Warnock, Phytologia 68: 4. 1990. [Fna] SE Tenn.:
Delphinium hansenii subsp. *ewanianum* M. J. Warnock, Phytologia 68: 3. 1990. [Fca] CA Calif.:
Myosurus apetalus var. *borealis* A. T. Whittemore, Novon 4: 78. 1994. [Fna] IM (CA/CAN/NW/OR/RM) Idaho: B.C.; Calif., Idaho, Mont., Nev., Oreg., Utah, Wash., Wyo.

Pulsatilla ludoviciana forma *glabrata* A. E. Porsild, Publ. Bot. (Ottawa) 4: 27. 1975 "1974." [Fyk] CAN Yukon:

Ranunculus auricomus subsp. *boecheri* L. Fagerström & G. Kvist, Ann. Bot. Fenn. 20: 241–242, fig. 1983. [T] GR (non-NA) Greenland: Sweden

Ranunculus auricomus subsp. *hartzii* L. Fagerström & G. Kvist, Ann. Bot. Fenn. 20: 243, fig. 1983. [T] GR Greenland:

Ranunculus ×*heimburgerae* T. C. Brayshaw, Royal British Columbia Mus. Mem. 1: 110, fig. 1989. [T] CAN/NW B.C.:

Thalictrum heliophilum D. H. Wilken & K. DeMott, Brittonia 35: 156, fig. 1983. [S] RM Colo.:

RHAMNACEAE

Ceanothus greggii var. *franklinii* S. L. Welsh, Rhodora 95: 413–414, fig. 1993. [Fut] IM Utah:

Ceanothus ophiochilus S. Boyd, T. Ross & L. Arnseth, Phytologia 70: 29–30. 1991. [f] CA Calif.:

Ceanothus prostratus forma *albiflorus* J. T. Howell, Mentzelia 1: 7. 1976 "1975." [f] IM Nev.:

Ziziphus celata W. S. Judd & D. W. Hall, Rhodora 86: 382–383, fig. 1984. [f] SE Fla.:

ROSACEAE

Cercocarpus ledifolius var. *intermontanus* N. H. Holmgren, Brittonia 39: 424, fig. 1987. [Fim] IM Utah:

Crataegus douglasii var. *duchesnensis* S. L. Welsh, Great Basin Naturalist 42: 10. 1982. [Fut] IM Utah:

Crataegus turnerorum M. Enquist, Phytologia 68: 298–299, fig. 1990. [T] TX Tex.:

Dryas chamissonis C. Sprengel ex B. A. Yurtsev, Arktich. Fl. SSSR 9(1): 322–323. 1984. [Fru] AK Alaska: Sprengel annotation; description attempted by S. Juzepczuk in 1929; here completed.

Geum ×*catlingii* J.-P. Bernard & R. Gauthier, Naturaliste Canad. 113: 321. 1986. [T] CAN/NE Que.: Ont.

Geum ×*macneillii* J.-P. Bernard & R. Gauthier, Naturaliste Canad. 113: 321. 1986. [T] CAN/NE Que.:

Horkelia yadonii B. Ertter, Syst. Bot. 18: 139–142, fig. 1993. [Fca] CA Calif.:

Ivesia aperta var. *canina* B. Ertter, Brittonia 40: 398, fig. 1988. [T] CA Calif.:

Ivesia longibracteata B. Ertter, Syst. Bot. 14: 233–235, fig. 1989. [T] CA Calif.:

Ivesia paniculata T. W. Nelson & J. P. Nelson, Brittonia 33: 165, fig. 1981. [f] CA Calif.:

Ivesia pityocharis B. Ertter, Syst. Bot. 14: 241–244, fig. 1989. [T] IM Nev.:

Ivesia rhypara B. Ertter & J. L. Reveal, Madroño 24: 224–226, fig. 1977. [f] IM Oreg.:

Ivesia rhypara var. *shellyi* B. Ertter, Syst. Bot. 14: 239–240, fig. 1989. [T] IM Oreg.:

Ivesia shockleyi var. *ostleri* B. Ertter, Syst. Bot. 14: 237, fig. 1989. [T] IM Utah:

Mespilus canescens J. B. Phipps, Syst. Bot. 15: 26–28, figs. 1990. [Fse] SE Ark.:

Neviusia cliftonii J. R. Shevock, B. Ertter & D. W. Taylor, Novon 2: 286, fig. 1992. [f] CA Calif.:

Potentilla ×*aleutica* J. Soják, Preslia 57: 265–266. 1985. [T] AK Alaska:

Potentilla angelliae N. H. Holmgren, Brittonia 39: 342, fig. 1987. [Fim] IM Utah:

Potentilla basaltica A. Tiehm & B. Ertter, Brittonia 36: 228–230, fig. 1984. [Fim] IM Nev.:

Potentilla cottamii N. H. Holmgren, Brittonia 39: 340–341, fig. 1987. [Fim] IM Nev.: Utah

Potentilla cristae W. J. Ferlatte & J. L. Strother, Madroño 37: 190–192, fig. 1990. [f] CA Calif.:

Potentilla finitima B. Kohli & J. G. Packer, Canad. J. Bot. 54: 714–716, fig. 1976. [T] CAN (GP/NE) Man: Alta., Sask.; Minn., N.Dak.

Potentilla ×*insularis* J. Soják, Bot. Jahrb. Syst. 106: 203–204, fig. 1986. [T] non-NA (GR) Spitsbergen: (Greenland)

Potentilla morefieldii B. Ertter, Brittonia 44: 432–433, fig. 1992. [Fca] CA/IM Calif.:

Potentilla pensylvanica var. *brevipila* J. Soják, Preslia 59: 301. 1987. [T] CAN Yukon:

Potentilla ×*protea* J. Soják, Preslia 57: 265. 1985. [T] GR (CAN/non-NA) Greenland: B.C., N.W.T.; Norway; Russia (Arhangel'skaja oblast)

Potentilla ×*subquinata* var. *niveoides* J. Soják, Bot. Jahrb. Syst. 106: 208. 1986. [T] GR Greenland:

Purshia pinkavae C. G. Schaack, Phytologia 63: 301–302. 1987. [T] SW Ariz.:

Rosa stellata subsp. *abyssa* A. M. Phillips, Madroño 39: 31–33, fig. 1992. [f] IM/SW Ariz.:

**Rubus ferrofluvius* H. A. Davis, A. M. Fuller & T. Davis, Castanea 47: 216–218. 1982. [T] NE Wis.: Minn. Two specimens cited as holotype.

Vauquelinia californica subsp. *sonorensis* W. J. Hess & J. Henrickson, Sida 12: 130–132, figs. 1987. [T] SW (MEX) Ariz.: Mexico

RUBIACEAE

Galium arkansanum var. *pubiflorum* E. B. Smith, Brittonia 31: 281–283, figs. 1979. [Far] SE Ark.:

Galium mexicanum subsp. *flexicum* L. T. Dempster, Madroño 23: 384–385, fig. 1976. [T] TX Tex.:

Hedyotis ouachitana E. B. Smith, Brittonia 28: 457–459, fig. 1977 "1976." [B] SE (MO-OK) Ark.: Okla.

Houstonia butterwickiae E. E. Terrell, Brittonia 31: 164–166, fig. 1979. [T] TX Tex.:

SALICACEAE

Populus ×*inopina* J. E. Eckenwalder, Madroño 29: 72–75, fig. 1982. [B] CA Calif.:

Populus fremontii subsp. *mesetae* J. E. Eckenwalder, J. Arnold Arbor. 58: 201–202, fig. 1977. [T] MEX (SW/TX) Mexico: (N.Mex., Tex.)

Salix arizonica R. D. Dorn, Canad. J. Bot. 53: 1499–1501. 1975. [B] SW Ariz.:

SAPOTACEAE

Bumelia reclinata var. *austrofloridensis* R. D. Whetstone, Ann. Missouri Bot. Gard. 72: 545–547, fig. 1985. [Fse] SE Fla.:

SARRACENIACEAE

Sarracenia alabamensis F. W. Case & R. B. Case, Rhodora 76: 653–655, figs. 1975 "1974." [T] SE Ala.:

Sarracenia alabamensis subsp. *wherryi* F. W. Case & R. B. Case, Rhodora 78: 315–317. 1976. [T] SE Ala.: Miss.

Sarracenia purpurea var. *burkii* D. E. Schnell, Rhodora 95: 8, figs. 1993. [B] SE Ala.:

Sarracenia rubra subsp. *gulfensis* D. E. Schnell, Castanea 44: 218–219, figs. 1979. [T] SE Fla.:

SAXIFRAGACEAE

Saxifraga bryophora var. *tobiasiae* J. W. Grimes & P. L. Packard, Brittonia 33: 430, fig. 1981. [f] NW/RM Idaho:

Saxifraga codyana P. Yu. Zhmylev, Byull. Moskovsk. Obshch. Isp. Prir., Otd. Biol. 97(1): 95–96. 1992. [T] CAN (AK) Yukon: Alaska

**Saxifraga hirculus* subsp. *coloradensis* K. O. Hedberg, Bot. J. Linn. Soc. 109: 389, 393. 1992. [T] RM Colo.: Designated "Orig. Coll." not holotype or equivalent.

Saxifraga razshivinii P. Yu. Zhmýlev, Byull. Moskovsk. Obshch. Isp. Prir., Otd. Biol. 95(3): 87–88. 1990. [T] CAN (AK) Yukon: N.W.T.; Alaska

Saxifraga tempestiva P. E. Elvander & M. F. Denton, Madroño 23: 346–348, figs. 1976. [T] NW/RM Mont.:

Saxifraga tischii R. J. Skelly, Madroño 35: 126–128, fig. 1988. [f] NW (CAN) Wash.: B.C.

SCROPHULARIACEAE

Agalinis navasotensis M. L. Dubrule & J. M. Canne-Hilliker, Sida 15: 426–431, figs. 1993. [T] TX Tex.:

Antirrhinum vexillo-calyculatum subsp. *intermedium* D. M. Thompson, Syst. Bot. Monogr. 22: 84–85, fig. 1988. [B] CA Calif.:

Castilleja genevievana G. L. Nesom, Phytologia 72: 210–213. 1992. [T] TX (MEX) Tex.: Mexico

Castilleja montigena L. R. Heckard, Syst. Bot. 5: 83–84, figs. 1980. [B] CA Calif.:

Cordylanthus eremicus subsp. *kernensis* T. I. Chuang & L. R. Heckard, Syst. Bot. Monogr. 10: 91–92, figs. 1986. [T] CA Calif.:

Cordylanthus kingii subsp. *densiflorus* T. I. Chuang & L. R. Heckard, Syst. Bot. Monogr. 10: 81, figs. 1986. [T] IM/RM Utah:

Cordylanthus rigidus subsp. *setigerus* T. I. Chuang & L. R. Heckard, Syst. Bot. Monogr. 10: 43–44, figs. 1986. [T] CA (MEX) Calif.: Mexico

Cordylanthus tenuis subsp. *barbatus* T. I. Chuang & L. R. Heckard, Syst. Bot. Monogr. 10: 58–59, figs. 1986. [T] CA Calif.:

Cordylanthus wrightii subsp. *kaibabensis* T. I. Chuang & L. R. Heckard, Syst. Bot. Monogr. 10: 87–89, figs. 1986. [T] IM/SW Ariz.:

Mimulus cupriphilus M. R. Macnair, Bot. J. Linn. Soc. 100: 3, figs. 1989. [T] CA Calif.:

Mimulus hymenophyllus R. J. Meinke, Madroño 30: 147–149, fig. 1983. [f] NW Oreg.:

Mimulus norrisii L. R. Heckard & J. R. Shevock, Madroño 32: 179–182, figs. 1985. [f] CA Calif.:

Mimulus shevockii L. R. Heckard & R. Bacigalupi, Madroño 33: 271–274, figs. 1986. [T] CA Calif.:

Orthocarpus tolmiei subsp. *holmgreniorum* T. I. Chuang & L. R. Heckard, Syst. Bot. 17: 565–566, fig. 1992. [T] IM/RM Utah: Idaho

Pedicularis contorta var. *rubicunda* R. N. Reese, Brittonia 36: 63–64, figs. 1984. [T] NW/RM Idaho: Mont.

**Pedicularis groenlandica* forma *chlorina* R. J. Staniforth, P. F. Maycock & J. Svoboda, Rhodora

93: 123–124, figs. 1991. [f] CAN Man.: No holotype designated.

Pedicularis lanata subsp. *yukonensis* A. E. Porsild, Publ. Bot. (Ottawa) 4: 57–58. 1975 "1974." [Fyk] CAN (AK) Yukon: Alaska

Penstemon absarokensis E. F. Evert, Madroño 31: 140–142, fig. 1984. [f] RM Wyo.:

Penstemon acuminatus var. *latibracteatus* as "*latebracteatus*" N. H. Holmgren, Brittonia 31: 232–234, fig. 1979. [Fim] IM Oreg.: Idaho, Nev.

Penstemon albifluvis J. L. England, Great Basin Naturalist 42: 367. 1982. [f] IM Utah:

Penstemon ammophilus N. H. Holmgren & L. M. Shultz, Brittonia 34: 381, figs. 1982. [Fim] IM Utah:

Penstemon angustifolius var. *dulcis* E. C. Neese, Great Basin Naturalist 46: 459. 1986. [Fut] IM Utah:

Penstemon angustifolius var. *vernalensis* N. H. Holmgren, Brittonia 31: 229–231, fig. 1979. [Fim] IM/RM Utah: Colo.

Penstemon atwoodii S. L. Welsh, Great Basin Naturalist 35: 378. 1975. [Fut] IM Utah:

Penstemon barnebyi N. H. Holmgren, Brittonia 31: 226–228, fig. 1979. [Fim] IM Nev.:

Penstemon debilis S. L. O'Kane & J. L. Anderson, Brittonia 39: 412–414, fig. 1987. [f] RM Colo.:

Penstemon distans N. H. Holmgren, Brittonia 32: 326, fig. 1980. [Fim] IM/SW Ariz.:

Penstemon dolius var. *duchesnensis* N. H. Holmgren, Brittonia 31: 219–220, fig. 1979. [Fim] IM Utah:

Penstemon floribundus D. M. Danley, Brittonia 37: 321, figs. 1985. [f] IM Nev.:

Penstemon flowersii E. C. Neese & S. L. Welsh, Great Basin Naturalist 43: 429, fig. 1983. [S] IM Utah:

Penstemon franklinii S. L. Welsh, Rhodora 95: 414–415, fig. 1993. [Fut] IM Utah:

Penstemon fremontii var. *glabrescens* R. D. Dorn & R. W. Lichvar, Madroño 37: 195–197, fig. 1990. [S] RM Colo.:

Penstemon gibbensii R. D. Dorn, Brittonia 34: 334. 1982. [Fwy] RM Wyo.:

Penstemon goodrichii N. H. Holmgren, Brittonia 30: 416, fig. 1978. [Fim] IM/RM Utah:

Penstemon humilis var. *desereticus* S. L. Welsh, Rhodora 95: 416, fig. 1993. [Fut] IM Utah:

Penstemon idahoensis N. D. Atwood & S. L. Welsh, Great Basin Naturalist 48: 496–498. 1988. [f] IM Idaho:

Penstemon immanifestus N. H. Holmgren, Brittonia 30: 334–336, fig. 1978. [Fim] IM Nev.: Utah

Penstemon janishiae N. H. Holmgren, Brittonia 31: 223–226, fig. 1979. [Fim] IM (CA) Nev.: Calif., Idaho, Oreg.

Penstemon leonardii var. *higginsii* E. C. Neese, Great Basin Naturalist 46: 459–460. 1986. [Fut] IM Utah:

Penstemon moriahensis N. H. Holmgren, Brittonia 30: 422–424, fig. 1978. [Fim] IM Nev.:

Penstemon mucronatus N. H. Holmgren, Brittonia 31: 234–236, fig. 1979. [Fim] IM/RM Utah: Colo., Wyo.

Penstemon navajoa N. H. Holmgren, Brittonia 30: 419–421, fig. 1978. [Fim] IM Utah:

Penstemon patricus N. H. Holmgren, Brittonia 31: 238–239, fig. 1979. [Fim] IM Utah: Nev.

Penstemon penlandii W. A. Weber, Phytologia 60: 459–460. 1986. [f] RM Colo.:

Penstemon pinorum L. M. Shultz & J. S. Shultz, Brittonia 37: 98, fig. 1985. [f] IM Utah:

Penstemon scariosus var. *cyanomontanus* E. C. Neese, Great Basin Naturalist 46: 460. 1986. [Fut] IM (RM) Utah: Colo.

Penstemon thompsoniae var. *desperatus* E. C. Neese, Great Basin Naturalist 46: 460. 1986. [Fut] IM Utah:

SMILACACEAE

Smilax jamesii G. A. Wallace, Brittonia 31: 416–418, fig. 1979. [T] CA Calif.:

SOLANACEAE

Browallia eludens R. K. Van Devender & P. D. Jenkins, Madroño 40: 214–217, figs. 1993. [Faz] SW (MEX) Ariz.: Mexico

Solanum davisense M. D. Whalen, Wrightia 5: 234–236, fig. 1976. [T] TX (MEX) Tex.: Mexico

Solanum heterodoxum var. *setigeroides* M. D. Whalen, Wrightia 5: 237–238. 1976. [T] SW (MEX/TX) N.Mex.: Mexico; Ariz., Tex.

Solanum pseudogracile C. B. Heiser, Bot. J. Linn. Soc. 76: 294. 1978. [T] SE N.C.:

Solanum tenuipes var. *latisectum* M. D. Whalen, Wrightia 5: 238. 1976. [T] MEX (TX) Mexico: Tex.

VALERIANACEAE

Valerianella longiflora forma *inexpansa* D. M. Eggers (Ware), Syst. Bot. 8: 42, fig. 1983. [B] SE Ark.:

Valerianella nuttallii forma *compacta* D. M. Eggers (Ware), Syst. Bot. 8: 42. 1983. [B] SE Ark.:
Valerianella radiata forma *demareei* D. M. Eggers (Ware), Syst. Bot. 8: 43, fig. 1983. [B] GP Kans.:

VERBENACEAE

Aloysia triphylla forma *serrulata* H. N. Moldenke, Phytologia 50: 308–309. 1982. [T] NE Ind.:
Clerodendrum lindleyi var. *paniculatum* H. N. Moldenke, Phytologia 34: 245. 1976. [T] SE La.:
Glandularia bipinnatifida var. *brevispicata* R. E. Umber, Syst. Bot. 4: 89–90. 1979. [B] SW N.Mex.:
Glandularia chiricahensis R. E. Umber, Syst. Bot. 4: 92–93. 1979. [B] SW Ariz.:
Glandularia polyantha R. E. Umber, Syst. Bot. 4: 98. 1979. [B] TX Tex.:
Glandularia verecunda R. E. Umber, Syst. Bot. 4: 99–100. 1979. [B] TX Tex.:
Lantana bahamensis var. *floridana* H. N. Moldenke, Phytologia 31: 373. 1975. [T] SE Fla.:
Lantana bahamensis forma *albiflora* H. N. Moldenke, Phytologia 31: 360. 1975. [T] SE Ga.:
Lantana depressa var. *sanibelensis* R. W. Sanders, Syst. Bot. 12: 55, fig. 1987. [B] SE Fla.:
Lantana horrida forma *latibracteata* H. N. Moldenke, Phytologia 38: 498. 1978. [T] TX Tex.:
Lantana ovatifolia forma *parvifolia* H. N. Moldenke, Phytologia 50: 309. 1982. [T] SE Fla.:
Lantana urticoides var. *hispidula* H. N. Moldenke, Phytologia 39: 424. 1978. [T] TX Tex.:
Phyla ×intermedia H. N. Moldenke, Phytologia 38: 498–499. 1978. [T] SE Ark.:
Verbena ×allenii H. N. Moldenke, Phytologia 34: 153. 1976. [T] SE La.:
Verbena halei forma *parviflora* H. N. Moldenke, Phytologia 34: 20. 1976. [T] TX Tex.:
Verbena scabra forma *ternifolia* H. N. Moldenke, Phytologia 29: 503. 1975. [T] TX Tex.:
Verbena wrightii var. *intermedia* H. N. Moldenke, Phytologia 39: 161. 1978. [T] SW Ariz.:

VIOLACEAE

Viola aduncoides A. Löve & D. Löve, Bot. Not. 128: 516. 1976 "1975." [T] CAN Man.:
Viola ×brauniae F. O. Grover ex T. S. Cooperrider, Michigan Bot. 25: 108–109, fig. 1986. [Foh] NE Ohio:
Viola ×cooperrideri H. E. Ballard, Castanea 58: 2, fig. 1993. [T] NE/SE W.Va.: Ohio, Tenn.
Viola ×eclipes H. E. Ballard, Michigan Bot. 28: 217, fig. 1989. [T] NE Mich.:
Viola frank-smithii N. H. Holmgren, Brittonia 44: 303–304, fig. 1992. [Fim] IM/RM Utah:
Viola guadalupensis A. M. Powell & B. Wauer, Sida 14: 1–2, fig. 1990. [f] TX Tex.:
Viola lithion N. H. Holmgren & P. K. Holmgren, Brittonia 44: 300–302, fig. 1992. [Fim] IM Nev.: Utah
Viola ×wujekii H. E. Ballard, Castanea 58: 3, fig. 1993. [T] NE (SE) Pa.: Md., W.Va.

VISCACEAE

Arceuthobium littorum F. G. Hawksworth, D. Wiens & D. L. Nickrent, Novon 2: 206–207. 1992. [T] CA Calif.:
Arceuthobium monticola F. G. Hawksworth, D. Wiens & D. L. Nickrent, Novon 2: 205–206. 1992. [T] OR (CA) Oreg.: Calif.
Arceuthobium siskiyouense F. G. Hawksworth, D. Wiens & D. L. Nickrent, Novon 2: 204–205. 1992. [T] OR (CA) Oreg.: Calif.
Arceuthobium tsugense subsp. *mertensianae* F. G. Hawksworth & D. L. Nickrent, Novon 2: 209–210. 1992. [T] OR (CA/CAN/NW) Oreg.: B.C.; Calif., Wash.

XYRIDACEAE

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Format for entries: see page 24 for more information.

Pinus californiarum D. K. Bailey, Notes Roy. Bot. Gard. Edinburgh 44: 278, 301–308. 1987. [T] CA (MEX/SW) Calif.: Mexico; Ariz., Nev.

Category of study:
[B]=biosystematics
[S]=plants of special concern
[f or Fx]=floristics
[T]=taxonomy

Floristic region based on origin of holotype:
AK=Alaska
CA=California
CAN=Canada
GP=Great Plains
GR=Greenland
IM=Intermountain
MEX=Mexico
MO-OK=Missouri-Oklahoma
NE=Northeast
non-NA=non-North American
NW=Northwest
OR=Oregon
RM=Rocky Mountain
SE=Southeast
SW=Southwest
TX=Texas

Political units of paratypes; alphabetical by country, by province/state. See page 24 for explanation of abbreviations.

Political unit of holotype followed by a colon. See page 24 for explanation of abbreviations.

Floristic region based on origin of paratype(s), if any.

Taraxacum discretum H. Øllgaard, Nordic J. Bot. 6: 21, fig. 1986. [T] non-NA (NE) Denmark: (Conn., Maine, Vt.)

All original material from outside NA; occurrence in NA clearly stated in protologue.

Poa sierrae J. T. Howell, Wasmann J. Biol. 37: 18–19. 1980 "1979." [f] CA Calif.:

When the actual year of publication differs from the title page year, the latter date is given in quotation marks.

Polyctenium fremontii var. *confertum* R. C. Rollins, [Harvard Pap. Bot. 4: 47–48, 1993] Cruciferae Cont. N. Amer., p. 716. 1993. [T] CA/IM Calif.: Nev. Originally, the herbarium in which the type specimen was deposited was not stated.

Names that were invalid when originally published have the original citation in square brackets, followed by the validating citation.

**Wyethia* ×*magna* A. Nelson ex W. A. Weber, Phytologia 53: 190. 1983. [Fco] RM Colo.: No Latin.

An asterisk indicates an invalid name.

The reason for the invalidity is also given.

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ISBN 0-915279-57-6